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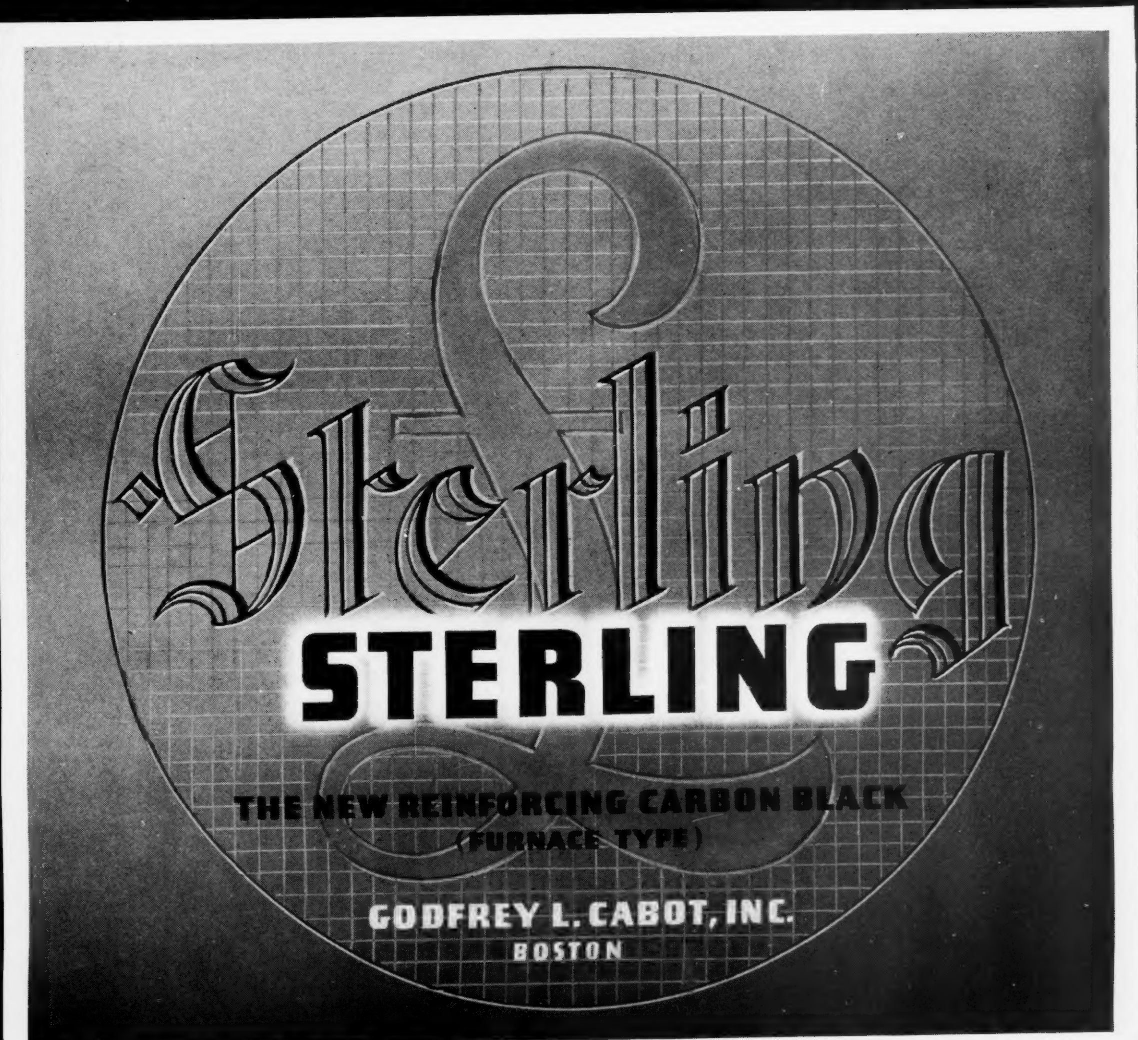
MARCH, 1943



Newsletter No. 3
MARCH, 1943

Published by Rubber Chemicals Division of DU PONT

RECLAIMED RUBBER-NEOPRENE BLENDS HELP CONSERVE NEOPRENE

AT THIS TIME an important contribution to the rubber program is the conservation of neoprene. Every pound of neoprene that is wasted means an unnecessary drain on the rubber stock pile—for today neoprene is replacing rubber in many products for the sole purpose of making the rubber stock pile last longer. More and more products which do not require exceptional physical properties are being made of neoprene. Technicians are developing adequate neoprene compounds and saving neoprene by incorporating more fillers, by using extenders and by blending with reclaimed rubber. These compounds do not conform to the uniformly high standard of performance which has been established by past experience, but they are *adequate* for the job they are required to perform, and in many cases superior to a similar rubber product.

Compounds suitable for use in the manufacture of many mechanical goods have been developed by utilizing blends of neoprene and reclaimed rubber. The vulcanizates of properly compounded blends have comparable stress-strain properties to those containing rubber and reclaim mixtures. Naturally, they do not have the outstanding resistance to oils, solvents, heat, sunlight and to chemicals which characterize the neoprene compounds we have recommended in the past, but they are superior in these properties to many of the rubber compounds they will replace.

COMPOUNDING—Reclaimed rubber and neoprene are compatible in all proportions. Two principal methods of accelerating these blends may be satisfactorily used.

1. The safest processing stocks contain from one to three per cent of a thiazole accelerator based on the total hydrocarbon present. The function of the thiazole is twofold since it apparently retards vulcanization of the neoprene phase while accelerating the rubber phase. Tests indicate that MBTS is the most effective thiazole for this purpose. No sulfur should be used as amounts as low as 0.25 per cent make the stock quite scorchy. Neutral reclaims are less objectionable than are alkali reclaims in this respect. Further, the inclusion of sulfur does not enhance the properties of the blends appreciably regardless of the type of reclaim used.
2. Sulfur may be used with Thionex acceleration to produce fast-curing stocks. However, this type of acceleration is more scorchy than the MBTS acceleration and should generally be used only when processing conditions can be carefully controlled.

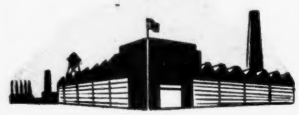
Physical test data, comparing the properties of a stock made from a neoprene-reclaimed rubber blend with those of stocks in which the elastomer content is present as neoprene, as crude rubber, and as mixtures of crude rubber and reclaimed rubber, are shown in the accompanying table. An alkali type whole tire reclaim was used and all stocks are loaded with soft carbon black.

The use of neoprene in conjunction with reclaimed rubber is discussed more fully in a report covering work conducted by a number of rubber reclaim suppliers in cooperation with the du Pont Rubber Laboratory. Copies of this report are available to all interested rubber manufacturers. Just drop us a line on your company letterhead requesting a copy of "Compounding Principles for Neoprene—Reclaimed Rubber Mixtures."

COMPARISON OF NEOPRENE, RUBBER, NEOPRENE-RECLAIMED RUBBER AND CRUDE-RECLAIM RUBBER BLENDS

	STOCK NUMBER			
% by Volume	A	B	C	D
Neoprene.......	—	—	58	29
Crude Rubber...	58	29	—	—
Reclaimed Rubber Hydrocarbon	—	29	—	29
Total Elastomer.	58	58	58	58
Physical Properties at Optimum Cure				
Modulus at 300%	1425	1100	1300	950
Tensile Strength —psi.........	2125	1400	1650	1200
Elongation at Break—%....	475	415	485	480
Hardness (Shore)	54	61	62	56
Cure at 289°F.— Minutes......	10	10	40	60
Scorch Test—Cure 60′/227°F.				
Tensile Strength —psi.........	475	775	150	125

Through the mill



Neoprene latex compounds *designed for the production of a number of different types of articles are presented in a series of bulletins recently prepared. The reports contain practical and specific information regarding the compounds and description of the methods, especially variations from the standard method, by which the products may be made. The products covered include neoprene latex thread, jacketing of wires from neoprene latex, meteorological balloons, neoprene latex on pile fabrics, neoprene latex proofed goods, surgeons gloves, heavy industrial gloves and light industrial gloves, and the coating of metal articles with neoprene from latex.*

The critical situation *regarding supplies of toluene has made it necessary for the War Production Board to restrict the use of formaldehyde-para-toluidine (Accelerator No. 8) to those products in which no other accelerator or accelerator combination can be employed to as good advantage and which products in turn play an important part in the war effort. We are advised now that it will be necessary to furnish a priority of AA-3 or better with all orders for formaldehyde-para-toluidine.*

Plasticizers *for use in Neoprene Type FR, GN and ILS compounds are evaluated in a recent report which will be sent to manufacturers of rubber goods. In the report particular attention has been paid to the effect of softeners on the heat and freeze resisting properties of the compositions.*

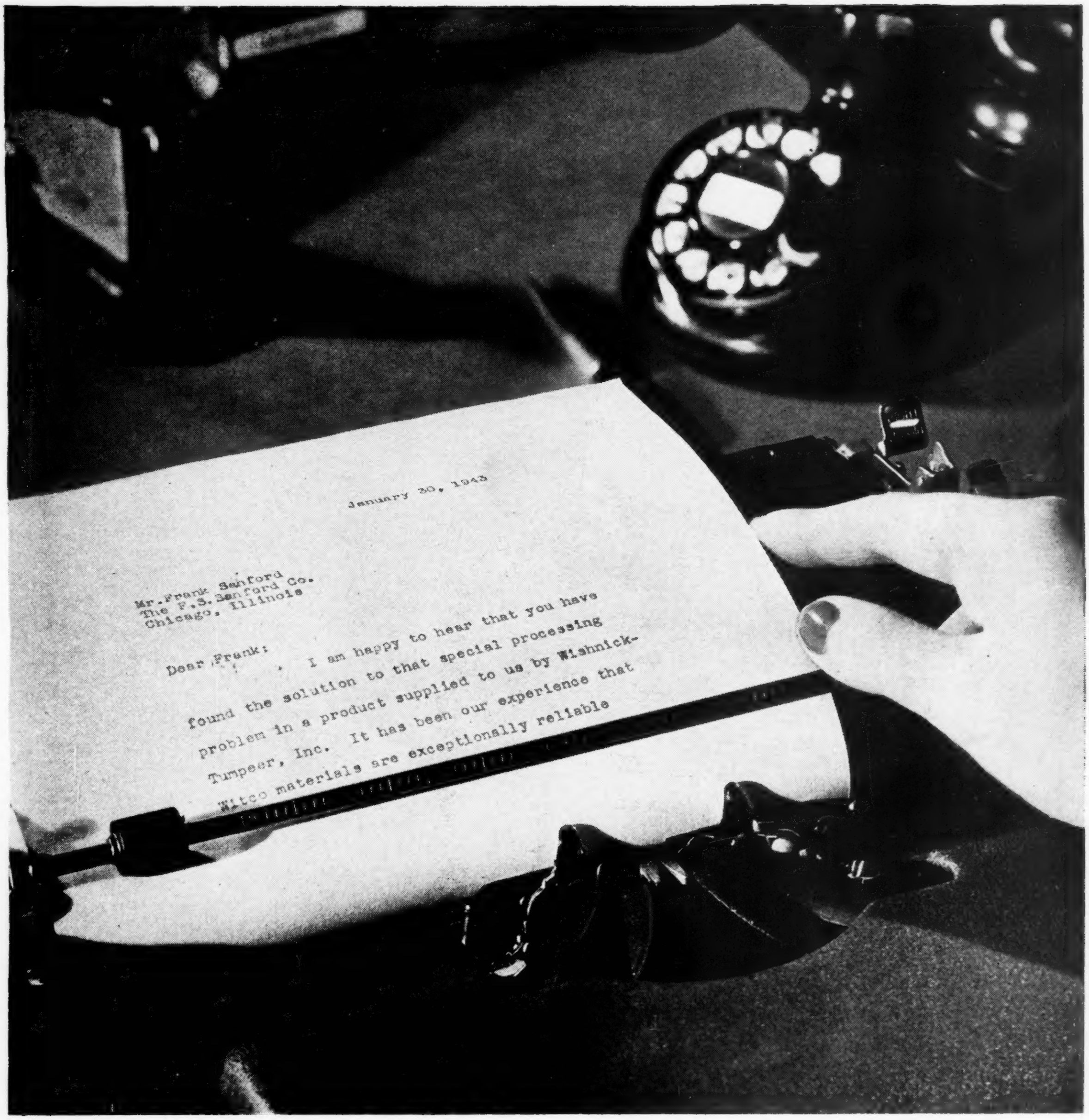
The use of THERMOFLEX A and NEOZONE A *in reclaimed tread stocks is covered in a recent report. The data should prove of interest wherever all reclaimed stocks are used under dynamic conditions, for example, in shock absorbers, tire carcasses, etc.*

DU PONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . Through Chemistry

INDIA RUBBER WORLD, March, 1943, Vol. 107, No. 6. Published monthly by BILL BROTHERS PUBLISHING CORP., Printing Office, Philadelphia, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.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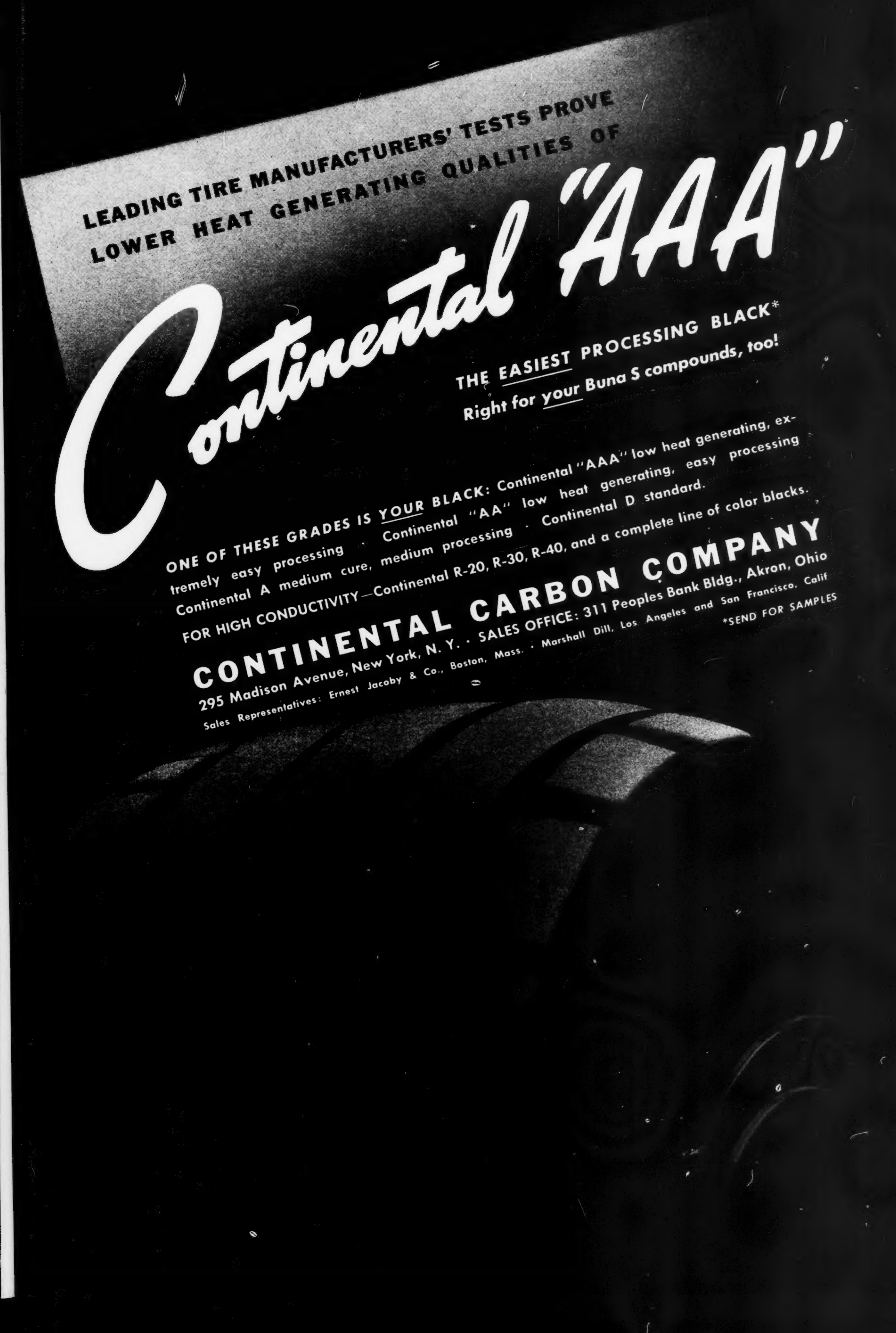
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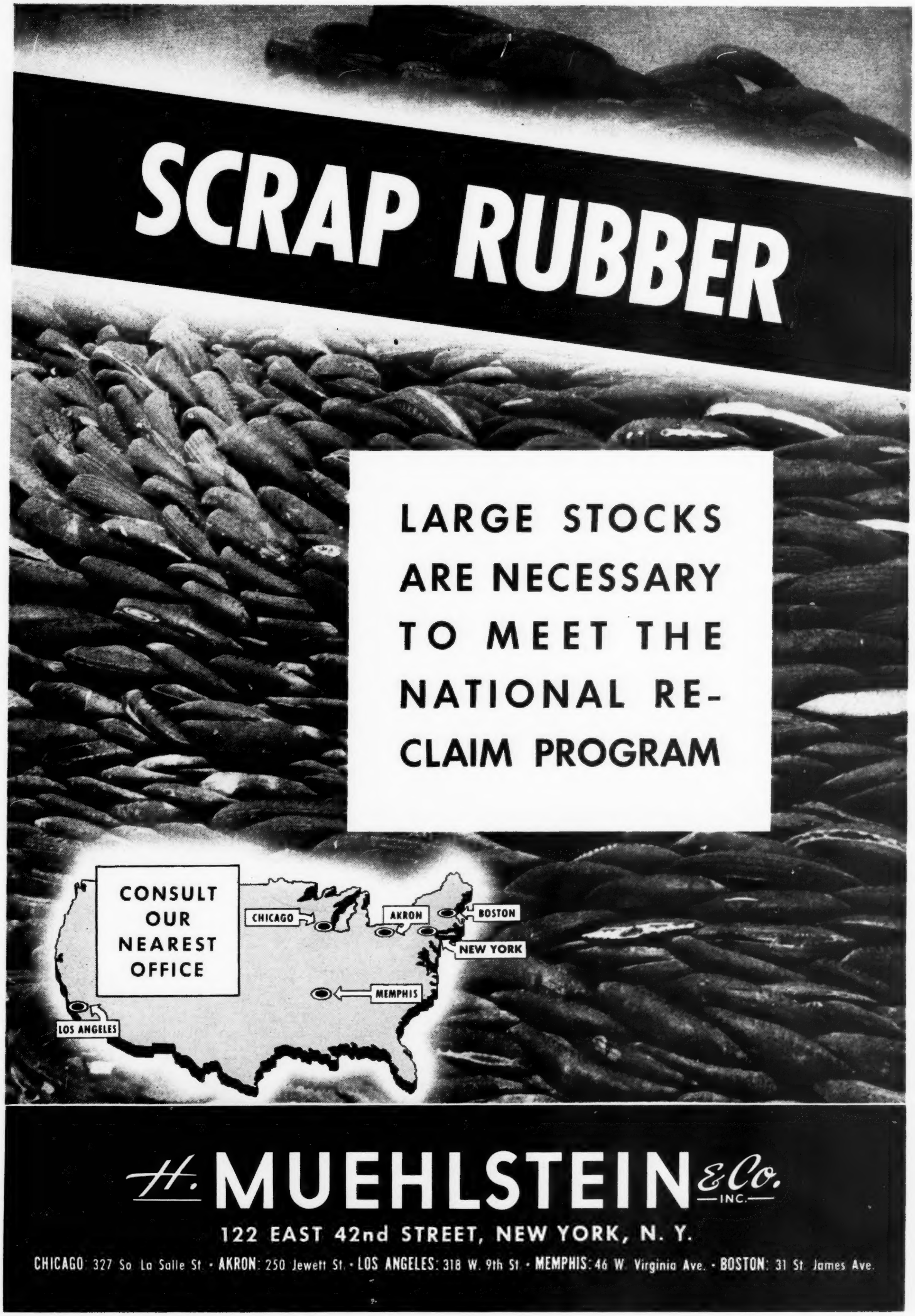
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March, 1943

VOLUME 107 NUMBER 6

A Bill Brothers Publication

INDIA RUBBER WORLD

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INDIA RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

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Compounding Neoprene Latex—I

Effect of Various Materials on Viscosity . . . .

B. Dales,[1] R. H. Walsh,[1] and H. H. Abernathy[1]

UP TO 1930 the amount of latex rubber used in the United States compared with the total amount of rubber used was insignificant. Since that time the percentage has steadily risen, and today hundreds of commercial articles are made from latex. Of these, many are essential to the armed forces. Articles are made from latex either because they cannot easily be made from dry rubber owing to processing difficulties or because of the superior qualities obtainable from unmasticated (i.e., latex) rubber. Now we are faced with an acute shortage of natural rubber latex; yet we must have articles made from latex. The obvious answer is to use synthetic latex, and this is being done.

Neoprene latex is one of the earliest synthetic latices. This material has been manufactured since 1932 and has found a continually growing place in industry. The latest type, Neoprene Latex Type 571, was introduced only a few months ago and has been shown to be adaptable to almost all the processes in which rubber latex is normally used. Already many superior war articles are being made from it.

In view of the growing importance of this new synthetic latex and the comparatively little data[2] concerning it which have been published, it is believed that specific information about the handling and compounding of the material will be of interest and value to the rubber industry. It is proposed to supply this information on Neoprene Latex Type 571 in the form of a series of articles, of which this paper is the first.

In adapting latex, either natural or synthetic, to manufacturing processes, it is almost invariably necessary to have some means of controlling its flow characteristics.

In the case of a normal Newtonian liquid, such as water, flow is adequately described by viscosity. However for a non-Newtonian liquid like Neoprene Latex Type 571, two parameters, viscosity and yield point, (the force necessary to produce flow) are necessary to describe its flow characteristics. A Newtonian liquid will flow under any applied force, however small, but a non-Newtonian one requires a definite force to start flow. In this paper we are mainly concerned with viscosity and specifically with substances by which the latex may be thickened. Preliminary determinations of yield point, however, have given a value of 0.027 gram per cm^2 at 28° C. for Neoprene Latex Type 571. Determinations were made using a Stormer viscosimeter and the yield point equations of Jordan, Brass, and Roe.[3] Mooney and Ewart[4] have also discussed the use of rotating cylinder instruments for determining yield point.

Viscosity

The viscosities of latex and latex compounds may be determined more or less accurately, using many of the standard instruments sold by laboratory suppliers. Among these are efflux viscosity instruments including the Parlin cups which have been described by Gardner.[5] A No. 10 Parlin cup has been used successfully in the du Pont Rubber Laboratory over a long period of time for control purposes. It is a cylindrical stainless steel cup open at one end; the closed end contains at its center an orifice 2.5 millimeters in diameter. The cup itself is 92 millimeters high (inside) and 35 mm. inside diameter and holds 88 cubic centimeters of liquid.

---

[1] With E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
[2] Reports B1-44 and 43-2 distributed by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., P. O. Box 525, Wilmington, Del. H. H. Abernathy, "The Current Importance of Synthetic Latices and a Review of One of Them", *Rubber Age (N. Y.)* Nov., 1942, p. 125.
[3] *J. Ind. and Eng. Chem. (Anal Ed.)* IX, 182 (1937); *Rubber Chem. Tech.*, X, 623-7 (1937).
[4] *Physics*, 5, 350 (1934).
[5] "The Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors." Seventh Ed., Oct., 1935, p. 585. Distributed at the Institute of Paint & Varnish Research, 2201 New York Ave., N.W., Washington, D. C.

Relative viscosity is measured by filling the cup to the brim with the test liquid and measuring the time in seconds necessary to empty the cup through the orifice. The end time is taken at the first break in the stream of material draining from the orifice. With the cup held rigidly vertical it is possible to obtain results duplicable to within 2% or less if an average of three determinations is taken. This experience is based on the range of times (30 to 100 seconds) obtained with the usual, non-thixotropic Neoprene Latex Type 571 compounds. It is, of course, well known that the relation of shearing stress per unit area to rate of shear produced will be linear in efflux viscosity determinations only if the flow occurs under a constant or nearly constant head of liquid, but the purpose of these experiments was to determine approximately the effect of various thickeners on a latex compound and not to measure viscosities with complete scientific accuracy. The results obtained by the simpler method of allowing the liquid to flow out as given indicate in a practical way which materials cause the most thickening and whether the thickening is permanent or temporary.

Viscosity Control

Thinning of Type 571 latex or compounds from it can easily be accomplished in nearly all cases by diluting with soft or distilled water. Therefore the question of viscosity control resolves itself for all practical purposes into a question of thickening. The most obvious and probably the most effective way of thickening a latex compound is by increasing its solids content, which may be done by concentrating the latex itself or by adding to it concentrated dispersions of compounding ingredients, or both. In many cases, however, it is feasible to do neither of these things, and a thickener must be used.

Neoprene Latex Type 571 compounded with the two basic ingredients necessary for producing good vulcanizates from it was used in studying the effect of the thickener on its relative viscosity. The two ingredients are zinc oxide and Neozone D-Distilled (phenyl beta naphthylamine). In the quantities used neither of these materials, if properly dispersed before being added to the latex, produces any noticeable effect on relative viscosity. The recipe (dry basis) used for testing follows:

Table I. Test Recipe

	Parts by Weight
Neoprene (from Type 571 Latex)	100.0
Zinc Oxide	5.0
Neozone D-Distilled	2.0
Thickener	as indicated

The zinc oxide and antioxidant were dispersed in 50% concentration before being added to the latex by pebble milling 48 hours in the following recipe:

Zinc Oxide	50.0
Neozone D-Distilled	20.0
10% Dispersing Agent (Darvan No. 1) Solution	7.0
10% Ammonium Caseinate Solution	21.0
Distilled Water	42.0

Since both the dispersion and the latex contained 50% solids, the concentration of the final mix was 50% solids.

Various quantities of several thickeners were tested; the range chosen in each case was based on past experience. The materials were added as aqueous solutions or dispersions as indicated. In each case test compounds were prepared and stored at 28° C. In all cases physical test films were prepared from the compounds. A study of these films revealed that none of the thickeners in the quantities used had any appreciable effect on tensile strength, modulus, rate of cure, hardness, or permanent set.

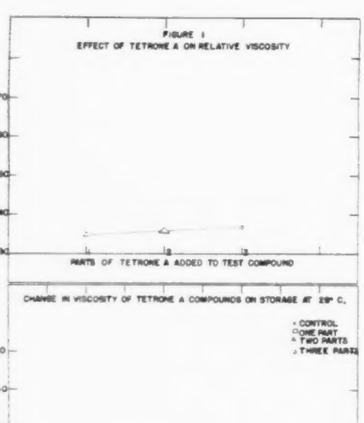
Each figure shown consists of two parts: the top part in each case shows the effect (as measured immediately after mixing) of varying quantities of thickeners on relative viscosity; the lower part shows the change in relative viscosity with time of storage at 28° C. for given quantities of thickeners.

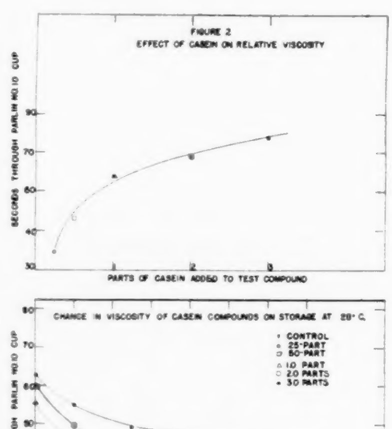
Certain rubber accelerators have been used in the past to thicken both neoprene and rubber latex. For example, Tetrone A, dipentamethylene thiuram tetrasulphide, is an excellent thickener for Neoprene latex Type 57.[6] This substance, however, is not an effective thickener for Type 571 latex; very little immediate increase in viscosity has been observed when as much as three parts of accelerator, used as 33% aqueous dispersion, were added to the latex. On storage some thickening occurred, which increased for five days and was gradually lost. (See Figure 1.)

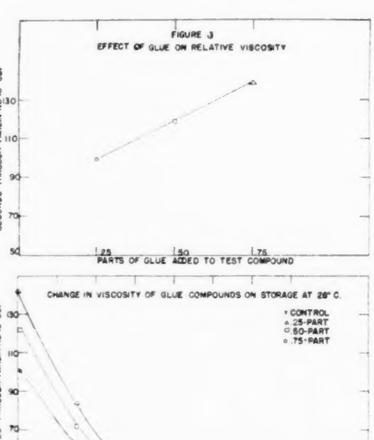
Proteins, such as casein and glue, are thickeners for latex. In Neoprene Latex Type 571 they produce marked thickening when first added to the latex, but after a few days' storage the viscosities of mixes containing them begin to decrease. On two weeks' storage at room temperature (28° C.) the viscosities of the mixes return to their original value. These facts are illustrated in Figures 2 and 3. Both casein and glue were used as 10% aqueous solutions; the casein was cut with ammonia.

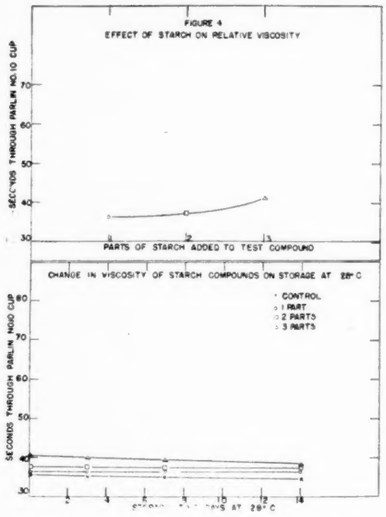
Gums and starches have sometimes been used as latex

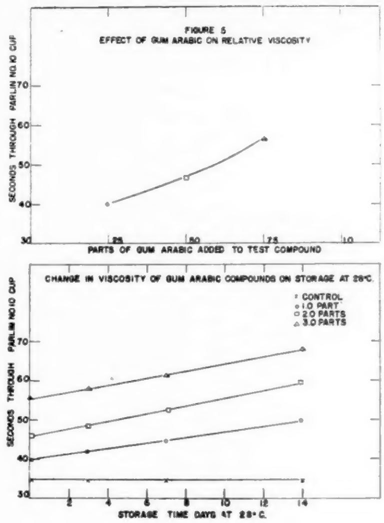
[6] Unpublished data, E. I. du Pont de Nemours & Co., Inc., Rubber Laboratory, P. O. Box 525, Wilmington, Del.

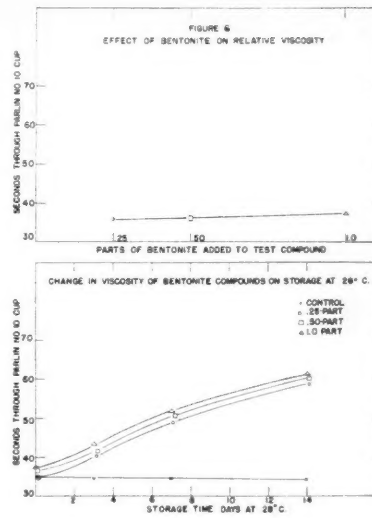


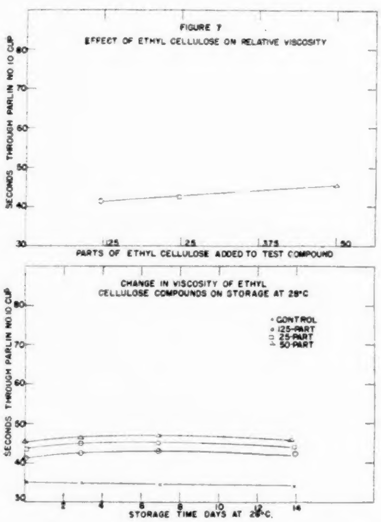


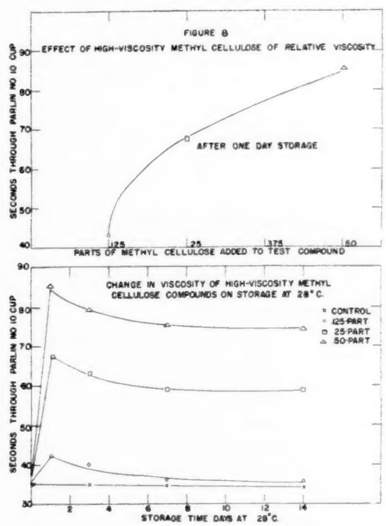


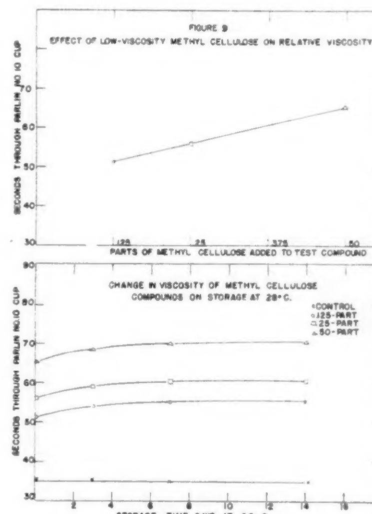












thickeners. Gum arabic and ordinary corn starch were tested in Neoprene Latex Type 571. Gum arabic was studied because other gums which are ordinarily used for thickening natural rubber latex flocculate Neoprene Latex Type 571 badly. Figures 4 and 5 shows that the starch had no effect on viscosity; while the gum arabic produced a very gradual increase in viscosity which, even after two weeks' storage, was not very pronounced. Both materials were added as 10% aqueous solutions.

Bentonite, like gum arabic, produced a gradual small increase in relative viscosity (Figure 6). The neoprene latex system in which the Bentonite was used had a pH of 11.5 and a specific conductivity of 0.01. In view of this and the known sensitivity of Bentonite gels to pH and electrolyte content, it is not surprising that this material, in the quantities used, produced little thickening. In larger quantities (such as five parts) Bentonite produces thixotropic mixes which are not very stable. Bentonite was used as a 10% water paste.

The effect of three cellulose derivatives on the viscosity of Neoprene Latex Type 571 was observed. Ethyl cellulose (Figure 7) produced some thickening, which was fairly permanent. High-viscosity methyl cellulose (Dow's 100 centipoise Methocel[7]—Figure 8) produced thickening which reached a maximum in one day then dropped off to an almost constant value. Low-viscosity methyl cellulose (Dow's 15 centipoise Methocel—Figure 9) produced a rather pronounced thickening, which was permanent over two weeks' storage time. This is almost ideal performance from a practical viewpoint. Apparently both methyl celluloses eventually produce about the same amount of thickening. However the low-viscosity material is easier to handle, and its thickening effect is immediate instead of delayed. The cellulose derivatives were used as 5% aqueous solutions prepared as follows: Five grams of material were placed in 95 grams of 90° C. water and allowed to stand overnight. The mixture was then homogenized by vigorous agitation which resulted in a clear solution.

Conclusions

Low-viscosity methyl cellulose appears to be a most useful thickener to use in Neoprene Latex Type 571. Transitory thickening is produced by casein and glue. Gradual viscosity increases are produced by gum arabic and bentonite clay. Starch and Tetrone A apparently are of no value as thickeners for Neoprene Latex Type 571.

A method of determining relative viscosity has been described.

[7] Sold by Dow Chemical Co., Midland, Mich.

Studies in Compounding Guayule Rubber II[1]

E. A. Hauser[2] and D. S. le Beau[2]

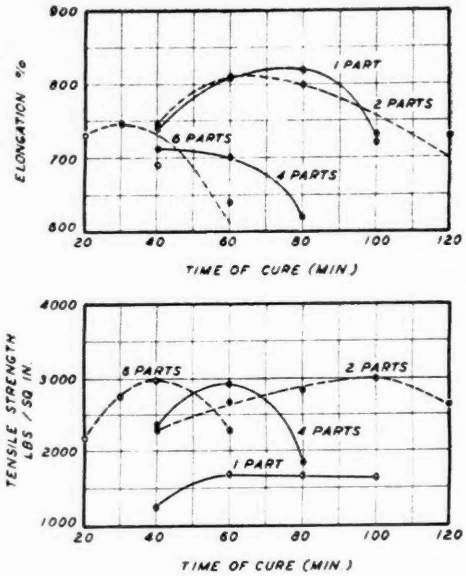


Fig. 1. Stearic Acid in Smoked Sheet Plus Guayule Resin

CERTAIN peculiarities in the compounding of guayule rubber have been reported in a previous communication.[3] At that time it was demonstrated that the effect of increased amounts of stearic acid on the physical properties of a rubber compound is far more pronounced in guayule than in *Hevea*. Guayule, if compounded with one part stearic acid to every 100 parts of commercially deresinified guayule rubber, showed an extreme retardation of cure and poor physical properties. However guayule compounds containing higher amounts of stearic acid exhibited curing properties very similar to those of *Hevea* rubber. Inasmuch as commercially deresinified guayule still contained 6% acetone extractable resin, it was difficult to decide whether these peculiarities were inherent characteristics of the guayule rubber hydrocarbon—which has a considerably lower molecular weight than *Hevea* rubber—or whether they were connected with the resin still present in the rubber. The difference in behavior during cure might be explained by the assumption that a chemical reaction occurs between the resin and the stearic acid so that the rubber is deprived of the well-known effect stearic acid exerts during vulcanization. In connection with this possibility it should be of interest to ascertain if this reaction is typical for stearic acid only or if it is a group reaction of the fatty acids.

To obtain an answer to this question it was decided to extract resin from non-deresinified guayule rubber and incorporate it into *Hevea* rubber (prime ribbed smoked sheet). *Hevea* rubber so resinified was then further compounded and tested in the customary way.

Experimental Procedure

Non-deresinified crude guayule as obtained from the Continental Rubber Co. of New York was subjected to acetone extraction. The acetone extract containing the resin was dried under vacuum, and the residue, a dark green, sticky mass of very strong aromatic odor,[4] was stored in dark containers to avoid oxidation by light.

Prime ribbed smoked sheet was compounded according to the following formulae which served as control for all other compounds.[5]

		Parts
Smoked sheet		100
ZnO		5
Captax		1
Sulphur		3
Stearic acid		X (1, 4, 6)
Mill temperature	115° F.	
Curing temperature	270° F.	

Increased amounts of stearic acid result in increased tensile strength, as can be readily seen. The rate of cure is not affected. (See Table 1.)

TABLE 1

	Tensile at Break, Lbs./Sq. In.			% Elongation		
	20 min.	40 min.	60 min.	20 min.	40 min.	60 min.
Control Compound with						
1 part stearic acid	2350	3000	2800	800	820	800
4 parts stearic acid	2300	3500	2900	750	740	700
6 parts stearic acid	3200	3900	3600	760	770	710

Stearic Acid in "Resinified" Smoked Sheet

Similar compounds—containing one part, two, four, and six parts stearic acid respectively—were prepared, and five parts guayule resin were added on the mill to each compound. The milling and curing temperatures were the same as for the control compounds. The physical properties of these compounds are shown in Figure 1.

It is evident that the tensile strength of the "resinified" compound containing one part stearic acid is only about 55% of that of the corresponding control, as given in Table 1, and that the rate of cure of the former has decreased considerably. The "resinified" compound containing two parts stearic acid corresponds in its tensiles to the control compound with one part stearic acid. Its rate of cure, however, also dropped appreciably. Contrary to the results obtained with the controls, no further rise in tensiles occurs with increasing amounts of stearic acid. The rate of cure of the "resinified" compounds rises steadily with increasing amounts of stearic acid. A "resinified" compound containing six parts stearic acid cures at the same rate as the control.

Contrary to this, previous experiments on the compounding of commercially deresinified guayule have shown that any increase in the amount of stearic acid above four parts will not result in a further increase of physical properties. But the rate of cure did not change so markedly either in compounds with two or four parts stearic acid as with smoked sheet containing guayule resin.

Stearic Acid-Guayule Resin Reaction

This extraordinary change in the rate of cure leads to the assumption that the reaction between the resin and the stearic acid must occur during vulcanization, and that

[1] This paper is based largely on data taken from the B.Sc. thesis of E. H. Stewart, Jr., carried out in the Chemical Engineering Department, M.I.T. (1943).

[2] Massachusetts Institute of Technology, Cambridge, Mass.

[3] INDIA RUBBER WORLD, 106, 5, 447 (1942).

[4] Since it has so far been impossible to obtain a satisfactory analysis of the seemingly very complex composition of the guayule resin, the amounts thereof as well as those of stearic acid used in the compounds discussed in this paper have been given in parts only for simplicity.

[5] No antioxidant was added to the formula to reduce the introduction of components and their possible effect on the reactions. All compounds were stored cool and tested in accordance with the time schedule prescribed by the A. S. T. M. so that the probability of aging effects can be safely disregarded.

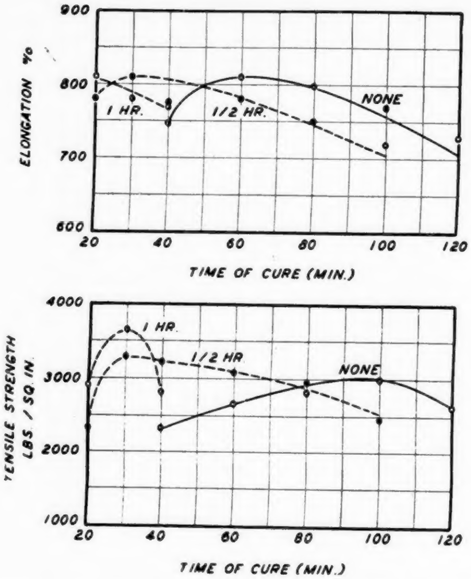


Fig. 2. Heating Guayule Resin and Stearic Acid before Compounding

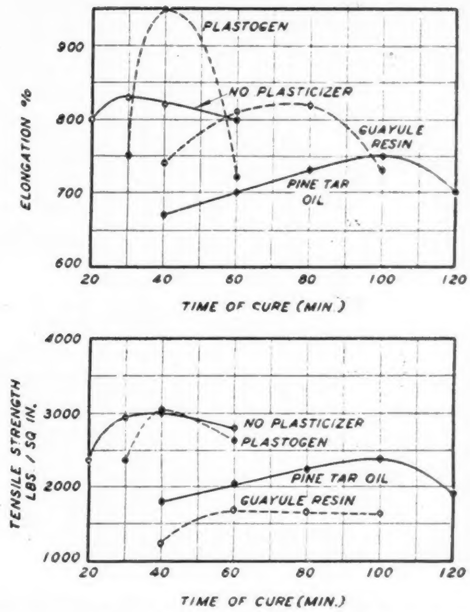


Fig. 3. Comparison of Various Plasticizers with Guayule Resin

this reaction seems to progress at a higher rate than the rate of cure so that the rubber compound is deprived of the effect stearic acid exerts on vulcanization. But the question still remains whether greater amounts of stearic acid are needed for the reaction with the resin alone or whether a surplus of stearic acid in the compound is essential to aid vulcanization as well as to react with the resin.

To decide between these two possibilities it seemed desirable to accomplish the reaction between stearic acid and resin prior to vulcanization. To that end five parts resin were preheated with two parts stearic acid ½-hour and one hour to 65° C. The mixture was then cooled and added to the smoked sheet on the mill. Further compounding proceeded in the regular way. No additional stearic acid was added. Results appear in Figure 2.

It can be seen that heating the resin together with the stearic acid for one-half hour prior to compounding results is such an increase in the rate of cure of the compound that it becomes equal to that of the control. When the resin and the stearic acid were heated for one hour prior to incorporation into the rubber, no further change in the rate of cure occurred. However in the latter case the tensile strength increased above the value obtained from "resinified" compounds to which six parts stearic acid had been added on the mill. Since no further increase in the rate of cure is obtained when preheating the resin with twice the amount of stearic acid, it is evident that not more than two parts stearic acid are needed to complete the reaction between the fatty acid and the resin. Furthermore these results prove conclusively that no retardation in cure occurs if the resin-stearic acid reaction has been carried out prior to vulcanization.

That much less stearic acid is needed to obtain optimum tensiles if the resin and the stearic acid are preheated together than if they react only during vulcanization, finds its explanation in the well-known fact that the physical properties of rubber depend to a certain extent on the speed of cure. If vulcanization has to be carried out over a long period of time, thermal degradation of the rubber molecule will occur, resulting in a deterioration of the physical properties. Where a separate reaction between the resin and the stearic acid is not practical—as in guayule rubber—a higher amount of stearic acid must be present in the compound during vulcanization to provide enough surplus so that vulcanization can proceed at the same time as the reaction between stearic acid and resin.

Plastogen, Pine Tar Oil in Place of Guayule Resin

To overcome criticism that the above results could be explained on the basis that the resin can be considered a diluent of the rubber, compounds were made where the resin was replaced by the same amount of Plastogen and pine tar oil. Figure 3 shows the physical properties obtained from such compounds.

It can be seen that Plastogen causes a slight retardation of the cure (as generally known), but does not affect the tensile properties. The increase in elongation was to be expected.

It is interesting, however, to note the similarity of the effect of pine tar oil and guayule resin. An increase of stearic acid in the pine tar oil compound will increase the tensile properties and the rate of cure, which is extremely low with small amounts of stearic acid.

In contrast to guayule resin, preheating the pine tar oil with stearic acid does not change the properties of the compounds.

Other Fatty Acids with Guayule Resin

The effect which fatty acids exert on rubber compounds is well known. It therefore seemed of interest to investigate fatty acids other than stearic in regard to their effect on the guayule resin. Palmitic, lauric, and oleic acids (four parts each) were compounded with smoked sheet containing five parts guayule resin. Figure 4 shows the physical properties of such compounds.

It can be seen that lauric and palmitic as well as oleic acid result in better tensiles and higher elongations than stearic acid. Compounds made with lauric acid, moreover, show a plateau effect which for practical purposes might be more desirable than the higher tensiles obtainable with palmitic acid compounds. It is interesting to note that these data follow the work published by Garner, Smith, and Boone,[6] who found that in plotting tensile

[6] "Rubber, Physical and Chemical Properties." T. R. Dawson and B. D. Porrett, R. A. B. R. M., p. 246, England (1935).

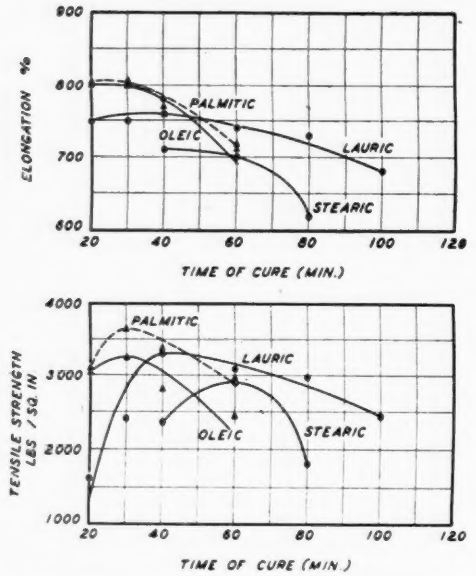


Fig. 4. Effects of Various Fatty Acids with Guayule Resin

strength versus number of carbon atoms of the respective acids a peak in activity can be noticed at 14 carbon atoms.

The high curing rate in the oleic acid compounds can be explained by the greater activity of unsaturated acids.

If guayule resin is preheated with lauric acid in the same way as described before, the same effect can be noticed as is obtained with stearic acid.

Before an ultimate choice of the most satisfactory fatty acid can be made the question of price, availability, and in particular its effect on the aging of the vulcanized compound will have to be taken into consideration.

Conclusions

The above results show conclusively that poor tensile properties occasionally reported for guayule compounds cannot be ascribed to the guayule rubber hydrocarbon, but are a consequence of the resin still retained in the commercially deresinified product.

These results also offer the explanation for the injurious effect exerted by the comparatively small amounts of guayule resin still present in commercially deresinified guayule rubber as well as the reasons why certain changes in compounding permit some compensation for these deficiencies. Nevertheless it becomes evident that only a more efficient resin extraction can be considered an ideal solution of the problem.

The authors are greatly indebted to the Continental Rubber Co. of New York for the underesinific guayule.

Report on Rubber Projects

NOREPOL, the rubber substitute from vegetable oils, now in commercial production, is a development of the Northern Regional Research Laboratory (from which it gets its name, NOrthern REgional POLymer), and was first announced about six months ago. Two companies have since adopted the Norepol formula, selling it under the respective names of Agripol[1] and Kempol.[2] Other firms have retained the name of Norepol for the finished product; while still others are making an intermediate material for manufacturers of rubber articles for the ultimate consumer. E. C. Auchter, research administrator, claims that only a small fraction of the country's needs can be filled by the new product in the coming year. The Baruch Report refers to it as being "in an interesting stage of development." Confirming the Committee's judgment that Norepol deserves attention is the fact that in the short time since, nearly 100 tons have been made and passed into consumer hands. Reliable estimates indicate a minimum demand of 12,000 tons in 1943; while the Research Administration of the Department of Agriculture claims that a much larger tonnage could be turned out each year.

W. J. Sparks, co-inventor of Butyl rubber, blocked out the basic reactions for the production of Norepol from vegetable oil in 1939. When Dr. Sparks returned to his former employer, the Standard Oil Co. of N. J., J. C. Cowan carried on to develop the specific reactions that resulted in the laboratory product from soybean, corn, or other vegetable oils. Then, under the supervision of R. H. Manley, chief, Division of Oil and Protein Research, Dr. Cowan, together with W. C. Ault and H. M. Teeter, completed the development of the Norepol process, the details of which are known only to the government and rubber manufacturers. The Department did reveal, however, that the process consists essentially in the controlled polymerization of the lineolic acid in the oil used. Tests at the Laboratory and in commercial plants show many potential uses for Norepol, including molded and extruded articles as rubber heels, jar rings, and gasket material.

Expansion of the guayule rubber production program has exceeded early expectations, the Department stated. The government purchased only 22,800 pounds of seed, the total available, when launching the project. Wet weather last spring delayed planting and encouraged weed growth, but aided the guayule seed crop. The summer and early fall brought forth approximately 180,000 pounds of cleaned seed. Though most of this yield was from plantings of stock made in 1941 or previously, 50% more seed was obtained from the nursery beds than was planted last spring. More than six tons of seed were gathered from the 1942 field plantings. The surprisingly large and early yield of seed makes possible the sowing of several thousand nursery beds in southern California this fall instead of next spring, when the Salinas nurseries in central California are to be sown. Salinas' 530 acres contain about 11,800 beds with 33,000 more in the making, 20,000 of them in southern California where yearly fall and spring seedling crops are anticipated.

About 300 million Salinas seedlings sown in the Spring of 1942 are now being transplanted on 30,000 acres. Last fall's seedlings will be planted on 31,000 additional acres next spring. Thus 63,000 acres will have been sown in 1942-43. Of these, 53,500 are expected to be ready for harvest and to yield about 21,000 tons of rubber beginning late in 1944. The new 1943 nurseries will supply seeds for 200,000 acres annually, supposed to yield between 70,000 and 80,000 tons of rubber. The Agricultural Research Administration conducts the research of the guayule program. The Bureau of Plant Industry is investigating possibilities of growing guayule in adaptable regions as California, Arizona, New Mexico, Texas, and Mexico. A few plantings have been made in states farther north for more cold-resistant varieties.

Several hundred tons of domestic guayule have been turned out to date since Pearl Harbor, and expectations are greater still.

(*Continued on page 575*)

[1] India Rubber World, Dec., 1942, p. 283.
[2] *Ibid.*, Feb., 1943, p. 476.

German Patents Relating to Vinyl Polymers—XIV

M. Hoseh

IN (127)[1] *is described a method to produce styrol reaction products; (165) outlines a further improvement of this method whereby instead of using an aromatic ether alone, it is used in combination with an aromatic hydroxy compound, e.g., phenol, naphthol, etc.* In (127) a mixture of styrol and an aromatic ether is acted upon by an acid substance capable of yielding (in solution) such acid products that promote polymerization of styrol. In (165) as in (127) the reaction is brought about by an acid yielding catalyst, e.g., $ZnCl_2$, $FeCl_3$, $ZnCl_2$-AcOH, $AlCl_3$, BF_3, HBF_4, $SnCl_4$, etc., and of these the last two are the most desirable. Among suitable ethers are: alkylphenyl ether, diphenyl ether, hydroalkylphenyl ether, their derivatives, the corresponding naphthol compounds, etc. Suitable aromatic hydroxy compounds are phenol, α-naphthol, β-naphthol, and their derivatives. The ratio of the respective constituents may vary widely. When a large excess of styrol is used, the products are soluble in benzine, drying, and non-drying oils. Such a product is obtained, from phenol ether 0.6 mols: phenol 0.4 mols: styrol 9-10 mols. With an increase of the aromatic components, the softening point of the product is lowered; thus phenol ether 0.5: phenol or naphthol 0.5: styrol 1-3 mols yields a viscous, oily product. The reaction is preferably conducted in an inert solvent such as toluol or CCl_4. Generally, the reaction can be conducted as described in (127).

A new composition for electric cable sheathing is given in (166). It consists of a mixture of polyacrylic acid esters, the usual fillers, and less than 1% of a fatty acid, a fatty acid anhydride, or a substance containing it, all worked in an extruder. The innovation consists in the addition of the fatty acid, or its anhydride. Although the addition is small, the results in the quality of the product are very marked. All the valuable properties are retained, and the surface is vastly improved, being smooth and glossy. Similar results are achieved by the addition of beeswax. The fatty acid or its anhydride may be incorporated at any convenient stage during manufacturing.

In (167) is described an improvement of (30).[2] In this latter the alkoxy group of the vinyl ester contained not over two C atoms. The improvement is that vinyl esters of any alkoxylated fatty acid, i.e., with more than two C atoms, are successfully polymerized. Thus, vinylisopropoxy acetate, vinylpropoxy acetate, vinylbutoxy acetate, vinylisobutoxy acetate, and generally vinyl esters of fatty acids of the type RCOOH where R is an aliphatic chain with at least three C atoms and a plurality of oxygen bridges, e.g., vinylisopropoxyethoxy acetate, are successfully polymerized. These compounds can be polymerized by themselves, or together with other polymerizable compounds such as vinyl acetate, vinyl chloride, acrylate, maleinate, vinyl ketone, etc. The polymerization can be conducted in block, in solution, or preferably in emulsion, with the aid of heat, light, or other accepted means. Promoters, e.g., benzoyl peroxide, oleic acid peroxide, H_2O_2, persulphates, etc., are used to advantage, but the polymerization will proceed without them. When an emulsion is worked with, its separation should be prevented. Suitable dispersants and emulsifiers are: carboxylates, sulphonates, sulphuric acid esters of organic compounds, sulphated fatty acids of alkyl naphthalene sulphonic acid, salts of sulpho acids and of sulphuric acid esters of higher fatty alcohols, oleates, and of oleic acid amides. Water soluble cellulose derivatives, polyvinyl alcohol, etc. also can be used to prevent the separation of the emulsion. At times it is advisable to prepolymerize the alkoxy fatty acid vinylate.

Addition products of dienes and double or triple activated carbon compounds cannot be polymerized in the usual way but they become amenable to polymerization if they are submitted to this reaction along with other polymerizable compounds (168). The usable addition products are those of butadiene, isoprene, dimethylbutadiene, β-chlorobutadiene, cyclopentadiene, cyclohexadiene, and of maleic anhydride, maleic esters, maleic imides, acrolein, vinylmethyl ketone, crotonaldehyde, cinnamaldehyde, cinnamic esters, acrylic and methacrylic acids and their derivatives, vinyl esters, vinyl chloride, vinyl ether, N-vinyl compounds (N-vinylcarbazol, N-vinyl pyrrol, etc.). Among the compounds suitable for the mixed polymerization are: styrol, acrylates, methacrylates, vinyl ester and ether, vinyl chloride, N-vinyl-carbazol, butadiene and chlorobutadiene. The polymerization can be induced by heating, preferably in the presence of catalysts such as benzoyl peroxide, acetyl peroxide, H_2O_2, or inorganic, acid reacting halides, e.g., BF_3. In some instances it is advisable to polymerize in an aqueous emulsion. To the latter are added the usual dispersing agents such as alkylated naphthalenesulphonic acids, sulphuric acid esters of higher fatty alcohols, etc. In certain cases it becomes necessary to treat the polymers with a basic solution, e.g., dilute alkali hydroxide or Na_2CO_3 in order to stabilize them. The softer polymers are subsequently treated like rubber; the harder ones are rolled into sheets, or pressed into tubes and rods.

The mixed polymerization of divinylbenzene with aromatic hydroxy compounds, which is an extension of (163),[3] *is dealt with in (169).* The reaction conducted in such inert solvents as CCl_4, benzine, xylol, etc. is catalyzed by $SnCl_4$, $AlCl_3$, or borfluoro acetic acid. At the end of the reaction the catalyst is washed out or removed with the aid of CaO, etc. The excess evolution of heat is regulated by cooling or by adding the catalyst slowly. Suitable aromatic hydroxy compounds are phenol, cresol, naphthol, hydroxydiphenyl, etc. The products range from oily to semi-solid substances, depending on the working conditions. They are used in lacquering technique and in manufacturing plastics and as plasticizers. The new products differ from the divinylbenzene polymers by their solubility in alkalies, by their mixability with heat-treated and blown drying oils, and by their solubility in aliphatic hydrocarbons. These properties are absent from ordinary divinylbenzene polymers.

By a new method described in (170), a further extension of (127),[1] *styrol is successfully replaced by divinylbenzene, preferably the ortho and para compounds.* The reaction may be conducted in an inert solvent, e.g., CCl_4, benzine, xylol, etc., and is also catalyzed by $SnCl_4$, $AlCl_3$,

[1] INDIA RUBBER WORLD, Nov., 1942, p. 171.
[2] *Ibid.*, Apr. 1, 1942, p. 43.
[3] *Ibid.*, Feb., 1943, p. 474.

and borfluoro acetic acid as mentioned in (169). When the reaction is completed, the catalyst is removed as usual. The heat evolution is regulated by cooling or by carefully adding the catalyst. Suitable aromatic ethers are phenol, cresol, naphthol, and hydroxydiphenyl ethers.

To make the very smooth surface or pliable foils and bands of polystyrol suitable for painting or coating with metals, the surface may be roughened by spraying or steeping in a suitable solvent such as benzene, amyl acetate, or a mixture of these two solvents (171). The roughened surface is then readily painted and can be coated with metal either by spraying or precipitating the metal on it. If the metal is to be deposited electro-chemically, the surface of the foil must be made conductive, as by coating the foil with graphite. Thus prepared, polystyrol foils and bands have manifold applications in the electrochemical industry.

New polymerization products and their preparation are described in (172). They are obtained by mixed polymerization of acylvinylcarboxylic acids, or their functional derivatives with other polymerizable compounds. The acylvinylcarboxylic acids are of the general type,

$$R \cdot CO \cdot CH : CH \cdot \overset{\overset{\displaystyle O}{/\!\!/}}{C} \cdot R_1,$$

where R is an alkyl or aryl, and R_1 is a hydroxyl, hydroxyalkyl, or an imido group. Among such compounds are acylacrylic acid and benzoylacrylic acid. The former is obtained by splitting off hydrohalic acid from α- or β- halocarboxylic acid, and the second is obtained from the reaction of maleic anhydride with benzene. Instead of benzoylacrylic acid can be used its chloro, nitro, or amido derivative. The polymerization proceeds smoothly in the presence of thinners, solvents, or in emulsion. The usual catalysts, regulators, and promoters may be used. The two components are used in equimolecular amounts. As the other polymerizable components, styrol, vinyl acetate, vinyl chloride, and vinylmethyl ketone can be used to advantage. The products are used for making plastics of all kinds, for coating, etc.

Water soluble, high molecular polymers of unsaturated acid amides are obtained by polymerizing the latter in the presence of up to 5% carboxylic acid computed on the basis of the monomer (173). The amide and the unsaturated carboxylic acid, or preferably its water soluble salt, are mixed together before polymerization, and the two polymerized together. If the free acid is used, it should be converted to a water soluble salt either during or after polymerization. Suitable amides for this reaction are acrylic acid amide and its homologs. Suitable carboxylates are the alkali and magnesium acrylates, methacrylates, maleinates, etc. The polymerization is conducted in an aqueous solution at 40-90, preferably 60-70° C. The ratio of the acid amide to water may vary in wide limits, e.g., 1:10 to 1:1. Preferably the polymerization is conducted in a ratio of 1:3—1:5 amide: water; more water is added at the end of the reaction. Instead of water may be used polyhydric alcohols, such as glycerol, glycol, or their water soluble derivatives. Other polymerizable substances may be added. The quantity and nature of the added substance determine the solubility of the product. The product is still soluble with additions of up to 30% of methyl acrylate, or up to 20% of ethyl acrylate. The products, clear to slightly yellowish, are used for the same purposes as gum arabic, British gum, starch, dextrin, polyvinyl alcohol, etc., for raising the viscosity of water or aqueous solutions, emulsions, finishing fabrics, sizing thread, adhesives, etc.

Polymerization in a continuous process can be done on an endless conveyer belt, according to (174). The mixture to be polymerized, including also thinners, solvents, catalysts, regulators, etc., is charged at one end, and the polymer is removed at the other. To prevent the spilling of liquid components, the belt may be equipped with raised sides. The belt travels through a suitable apparatus.

Strong, resistant structural sheets having excellent mechanical properties and of many uses are made from a porous or absorbent material impregnated with hard polymers of unsaturated organic compounds containing the group $CH_2{:}C<$ (175). The porous or absorbent material, such as jute, linen, paste board, filter paper, etc., is placed into a mold with smooth walls. The mold is then filled with the polymerizable monomer, which also may be partly prepolymerized, and the whole is polymerized preferably under pressure. Polymerizable compounds suitable for this purpose are methyl and ethyl esters of methacrylic acid, vinyl acetate, styrol, etc. The compounds can be used singly or mixed. Additions such as phthalates, tartarates, phosphoric acid esters, acetin, drying and nondrying oils, mineral oils, natural or synthetic resins, condensation products, dyes, pigments, etc. may be made to suit the particular requirements. The monomer is absorbed by the porous material, and after polymerization a product is obtained which has excellent mechanical and electrical properties. It is resistant to oil, water, alkalies, acid, and gases, and can be used for lining walls and floors, for door and window frames, in automobiles, railroad cars, airplanes, toys, etc. The product may be obtained clear, colored, or in any desired color combination.

The thickening of water-insoluble organic liquids is important for many technical purposes, and this can be readily accomplished by dissolving in the organic liquid a high polymer containing radicals which can be saponified to a carboxyl or hydroxyl, e.g., esters or nitriles; to the solution is then added an alkali saponifier (176). The amount of the latter is such that the partly saponified polymer imparts to the solution a gel-like consistency. For this purpose are suitable polymers containing a carboxyl or an alcohol. In the first group are polymers and mixed polymers of acrylic esters, acrylic nitriles, and derivatives of maleic acid. In the second group are cellulose esters and polyvinyl esters. As saponifiers are used sodium and potassium hydroxides, and sodium and potassium alcoholates. Usually 0.5-1% solution of the polymer dissolved in a suitable solvent suffices. The quantity of the saponifier is computed so that only approximately 10% of the ester groups is saponified. Too much of the saponifier will cause a separation of the organic liquid. The choice of the thickener depends on the organic liquid. The thickened liquids can be used as size, paint, protective coatings, etc. Many details are given in the original.

The utilization of waste high molecular weight polymers of the polymethacrylic acid esters of the lower alcohols requires that their degree of polymerization be reduced, a method for which is described in (177). These high polymers are quite hard, and in order to use them, for example in lacquers, mechanical working of the material is resorted to and under ordinary conditions is difficult. However better results are obtained if the kneading or mastication is done for a short period, e.g., 15 or 20 minutes, at a temperature between the softening point and the decomposition point of the polymer and in the presence of an oxidizing agent. Any oxidizing agent may be used: especially suitable are the peroxides, e.g., debenzoyl perox-

(*Continued on page 575*)

Advances in Plastics during 1942[1]

G. M. Kline[2]

PLASTICS had a rendezvous with war in 1942. How well they proved their mettle during that first encounter with a market stripped of all decorative and novelty appeal and calling for cold utility and unfailing performance under fire will be evident from the facts presented in this review.

Materials

Statistics released during the year indicated that the production of plastics during 1941 was more than 57% greater than in 1940. Because of restrictions on manufacture and uses of most all types of plastics, the same rate of growth may not have been maintained during 1942. However the statistics will probably show that the industry's production in 1942 doubled that of 1940, just as 1941 doubled that of 1939. The total production of resins reported in 1941 was about 438,000,000 pounds, and that of cellulose plastics was 53,400,000, which together with unreported materials established an industry record at about the 500,000,000-pound figure (*1*).[3]

Because of the difficulties in obtaining equipment for new plants, there was little activity in the marketing of new materials. One outstanding development, a thermosetting transparent resin which polymerizes without the evolution of water and hence is especially adapted to low pressure molding, was reported (*2*). This resin is considerably more resistant to scratching than other types of transparent plastics. Its chemical identity has not been disclosed so that it is known only by the trade name, "Columbia Resin 39."

Several articles were published which described improvements in the formulation of molding compounds with various fillers and plastic binders. These pertained to compositions containing walnut shell flour (*3*), styrene plasticized with chlorinated diphenyl for high-frequency work (*4*), sisal fiber (*5*), mica and lead borate (*6*), cord-filled phenolic (*7*), and aniline-formaldehyde resin (*8*).

The effect of restrictions in use of synthetic resins was reflected in the number of reports describing plastic compositions made from non-critical raw materials, generally of natural origin. These dealt with the use of lignin (*9-12*), bagasse (*13*), rosin (*14*) and related substances (*15-16*), redwood fibers (*17*), and miscellaneous hydrocarbons (*18-19*). The use of agricultural by-products as sources of raw materials for plastics was discussed in two papers (*20-21*).

The swelling properties of various fillers in water and alkali solution were reported (*22*).

Molding and Fabricating

Injection molding of thermosetting plastics made rapid strides during 1942. The basic characteristic of this new process is the introduction into the material of all the heat load required for polymerization prior to injection into the mold which shapes and sets the plastic. It is reported to provide parts of uniform density and excellent quality on fast production schedules and to be especially adapted to molding parts with inserts (*23*).

Further progress was made in the utilization of low-pressure molding methods in the fabrication of relatively large parts for aircraft and other military purposes. Several reviews of the problems and advantages of this technique were published (*24-26*), and an important patent relating to the field was granted (*27*). The urea-formaldehyde resins continued to predominate as the bonding agent for production in this field, but there was considerable activity in the development of phenolic resins which would be suitable for use at low temperatures and pressures. Reference has already been made to the adaptability of the Columbia resins to low-pressure molding.

The use of zinc alloys for casting molds which are suitable for short runs on plastic parts was described (*28*). Availability of these molds at present is restricted to high priority needs because of shortages of the alloying elements, aluminum, copper, and magnesium. A report appeared concerning the effects of annealing conditions on the hardness of mold steels (*29*).

Applications

The normal market of the plastics industry was blitzed by the military during 1942. However it was an attack in which the industry cooperated fully, and the record shows a rapid and effective conversion of materials and molding facilities to production for war. Ordnance components molded of plastics included handles for pistols, bayonets, and machine guns (*30*), fuse parts (*31*), ammunition rollers (*32*), and booster tubes (*33*). Quartermaster supply items fabricated from plastics included helmet liners (*34, 35*), whistles (*36*), bugles (*37*), skis (*38*), and raincoats (*39*). Chemical warfare services utilized plastics extensively in gas masks (*40, 41*). The battlefleets employed plastics in navigation instruments (*42*), wire and cable insulation (*43, 44*), binoculars (*45*), and tableware (*46*). Small landing-craft and swift patrol boats were made of resin-bonded plywood (*47, 48*). Goggles (*49*), wire-reenforced flexible window enclosures (*50*), parachute flare bases (*51*), and stirrup pumps (*52*) were among the miscellaneous war products in which plastics were used. The background of experience in these applications of plastics and the accumulation of results of experimental and service tests on various plastic parts can be expected to lead to an even more amazing array of diverse military applications of molded plastics during 1943.

The aircraft industry utilized plastics on an expanding scale for many such parts which have become standard accessories. Reports of developments in masts (*53*), dies for forming metal sheets (*54*), fairleads (*55*), pilot seats (*56, 57*), radio loop housings (*58*), and propellers (*59*) were published. Plastic-plywood was employed in the construction of trainers (*60, 61*), gliders (*62, 63*), and miscellaneous structural parts and accessories (*64-68*).

Developments in plastic-plywood for use in building construction (*69*) and a variety of direct war applications (*70-72*) were described. Improvements in the resinous impregnating and bonding agents employed in this field were reported (*73-75*).

Reviews were published pertaining to the applications of plastics in marine bearings (*76*), water meter disks (*77*), name plates (*78*), closures (*79*), collapsible tubes (*80, 81*), and printing plates (*82*). Experimental studies on plastics for lighting fixtures (*83*) and dentures (*84*) contributed materially to these specialized fields.

There were two significant reports on the development of elastic plastics to replace rubber in some of its miscel-

[1] Presented before the Rubber & Plastics Group of the American Society of Mechanical Engineers, Hotel Astor, New York, N. Y., Dec. 3, 1942.
[2] National Bureau of Standards, Washington, D. C.
[3] Bibliography references are listed at end of article.

laneous applications (85, 86). More emphasis can be expected to be given to these elastic plastics in 1943.

Another noteworthy feature of the literature of 1942 is the occasional consideration given to post-war applications of plastics. These articles included discussions of shipbuilding (87), home construction (88, 89), and design of industrial products (90, 91), as well as post-war competition of plastics with metals (92). A patent was granted to Henry Ford for an automobile body fabricated from plastics (93). Further constructive planning of this sort during 1943 will enable the plastics industry to take the eventual transition from war to peace in a stride worthy of a progressive and growing industry.

Properties, Testing, Specifications

There was a gratifying increase during 1942 in the number of published papers setting forth the results of investigations of the mechanical properties of plastics. Many more engineering data of this type are needed to utilize plastics effectively in the military and post-war industrial fields. Committee D-20 on Plastics of the American Society for Testing Materials, and the Rubber & Plastics Group of the American Society of Mechanical Engineers have been very active in promoting the preparation and distribution of these reports. The cooperation of all research and testing laboratories in the industry is needed to augment further our basic knowledge of the properties of plastics.

Four papers concerning various properties of plastics were presented at the 1942 annual meeting of the American Society for Testing Materials. One of these (94) gave data for the tensile, flexural, and impact strengths of phenolic molding compounds over the temperature range of –80° to 225° C. (–112° to 437° F.). Another described experimental work on the determination of the mar resistance of various types of plastics (95). Further work at the University of Illinois on the properties of cellulose acetate plastic was reported (96); this portion of the investigation was concerned with the effect of time on the deformation of the cellulose acetate material when subjected to constant tensile loads for periods of time up to about 10 months. The effect of acids and alkalies of various concentrations on different types of plastics was determined by means of a shear strength test in the fourth paper of this group (97).

Six papers relating to plastics were presented before the Rubber & Plastics Group of the American Society of Mechanical Engineers during 1942. The bearing strengths of paper- and fabric-base phenolic plastics were compared with birch plywoods after conditioning the specimens at 160° F., 70° F. and 50% relative humidity, and 70° F. in water, respectively (98). Another report described the behavior of plastics under sustained vibrations from a new osciliatory-type testing machine in tension, compression, and torsion (99). The physical properties of new types of laminated plastics are tabulated in a third paper (100). Information regarding the strength properties of plastic-plywood employed in the fabrication of aircraft structural parts is presented in another report (101). The two remaining papers have not yet been published. One (102) presents information regarding the effects of heating for periods up to three weeks at temperatures ranging from 110° to 225° C. The other (103) supplements information previously published on the mechanical strength and fatigue properties of cellulose acetate, based on work conducted at the University of Illinois.

A number of other papers dealing with various mechanical properties of plastics were published during 1942. These related to the influence of temperature on the properties of polystyrene (104), the effect of solvents on plastics as determined by reduction in shear strength (105), impact strength (106, 107), flow properties (108), and bending fatigue (109).

Eight new tentative standards (110), prepared by Committee D-20 on Plastics of the American Society for Testing Materials, were adopted during 1942. The titles of these are as follows: Repeated Flexural Stress (Fatigue) Test of Plastics (D671-42T); Test for Haze of Transparent Plastics by Photoelectric Cell (D672-42T); Test for Mar Resistance of Plastics (D673-42T); Long-Time Tension Tests of Plastics (D674-42T); Terms and Descriptive Nomenclature of Objects Made from Plastics (D675-42T); Method of Test for Compressive Strength of Plastics (D695-42T); Method of Test for Coefficient of Linear Thermal Expansion of Plastics (D696-42T); and Method of Test for Water Vapor Permeability of Plastic Sheets (D697-42T).

The Specifications Subcommittee of Committee D-20 prepared tentative specifications for phenol-formaldehyde, urea-formaldehyde, melamine-formaldehyde, polystyrene, cast methyl methacrylate, cellulose nitrate, and rigid vinyl chloride acetate plastics. Preliminary drafts for cellulose acetate, cellulose acetate butyrate, and laminated phenolic plastics were circulated for comment and are expected to be adopted as tentative standards early in 1943. At the request of several government departments, a joint committee of representatives of the American Society for Testing Materials, the Society of Automotive Engineers, and of the Army and Navy was organized in December as Section 10 of the A. S. T. M. Plastics Specifications Subcommittee to prepare specifications for the non-rigid plastics. Included among these are the elastic vinyl, polyacrylate, and ethyl cellulose plastics.

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German Patents

(Continued from page 572)

ide, benzoylacetyl peroxide, NA_2O_2, BaO_2, etc. Of these the organic peroxides are preferable, for under the influence of the heat they volatilize completely. The process is still further facilitated if the mechanical treatment is preceded by steeping the polymer in a solvent or a swelling liquid. Tetrahydronaphthalene is very suitable for this because it plastifies the high polymer and at the same time has oxidizing properties.

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Report on Rubber Projects

(Continued from page 570)

The Department reports that *kok-saghyz* can be grown successfully in the northern tier of states from Vermont to Oregon. St. Paul, Minn., had the highest yield, up to 8,000 pounds of roots per acre in some spots. This work was classified as experimental, however, and can therefore offer no immediate relief to the rubber situation. No *kok-saghyz* will be available for farm planting at present either.

An average yield of rubber from the raw roots of somewhat more than 1%, or about 4½% on the roots, dry weight, as compared to a 6-8% average from fall-harvested mature roots in the U.S.S.R., is the report of preliminary tests made at the Agricultural Research Administration's Eastern Regional Laboratory in Philadelphia, Pa., for *kok-saghyz* grown in this country.

Progress Report No. 2 of Rubber Director

In presenting the second progress report of the Office of the Rubber Director, I again should like to quote from the Report of the Rubber Survey Committee[1] of September 10, 1942, and from the President's letter of one week later. The Report said:

"Of all critical and strategic materials, rubber is the one which presents the greatest threat to the safety of our nation and the success of the Allied cause. Production of steel, copper, aluminum, alloys or aviation gasoline may be inadequate to prosecute the war as rapidly and effectively as we could wish, but at the worst we are still assured of sufficient supplies of these items to operate our armed forces on a very powerful scale. But if we fail to secure quickly a large new rubber supply, our war effort and our domestic economy both will collapse. Thus the rubber situation gives rise to our most critical problem." (Report of the Rubber Survey Committee, September 10, 1942.)

This statement of the problem, together with the following sentence from the President's letter of September 17, which stated in part: "I want to carry out the recommendations in the Baruch Report as fully as possible . . . ," has been the basis upon which my organization has operated since my appointment as Rubber Director.

My first progress report[2] emphasized the necessity of avoiding further delay in building the rubber program. Since then it has become more and more evident that the timing of this program is critical and will determine its success or failure. Consequently, this report deals in some little detail with the present status of the building program.

The Plant Construction Program

Upon convening in the Fall of 1942, the Rubber Survey Committee found a program under way which then contemplated the production in the United States of 877,000 tons of synthetics a year. In its report it recommended the following plan for increasing that program:

(1) Carrying through the plants then planned for producing butadiene for Buna S.

(2) Providing an additional 100,000 short tons a year of "quick" butadiene from refinery conversions.

(3) Providing 30,000 tons a year of Buna S from grain by processes to be selected in the Spring of 1943.

(4) Erecting sufficient additional copolymerizing and styrene capacity to balance the resultant total.

(5) Erecting plants to produce an additional 20,000 tons of neoprene.

TABLE 1. THE BARUCH COMMITTEE PROGRAM (UNITED STATES ONLY) [Long Tons per Year]

	August 1942 Program	Additional Recommended Capacity	Total
Buna S..	705,000	140,000	845,000
Neoprene	40,000	20,000	60,000
Butyl....	132,000	......	132,000
Total..	877,000	160,000	1,037,000

In the Fall of 1942, contracts were let for the additional neoprene and the refinery conversions recommended by the Baruch Committee.

For the latter, the "Houdry Process,"[3] which by then had been sufficiently piloted, appeared to be a most promising method. Consequently, 60,000 tons of annual capacity were allocated to it in addition to the 15,000-ton Houdry plant in the initial program and another 15,000-ton plant under consideration for the Pacific Coast. The latter is needed to protect the feed stock situation on the West Coast where the demands of other programs, according to the Petroleum Administration for War, may force a change early next year from the cracking of naphtha to the synthesizing of butadiene from butane.

This was the situation on November 30, 1942, when Progress Report No. 1 was issued. Since that time, there have been the following new developments:

(1) The shortage of critical components (such as valves, heat exchangers, turbines, blowers, pumps, motors, etc.) is so great that the refinery conversions for "quick" butadiene production cannot be finished in anything like the time originally envisioned by the Baruch Committee.

(2) It has been decided that other programs are of equal urgency with the rubber program, so that further delays must be expected in completing the last part of the rubber program.

(3) The expansion of the high-octane gasoline program makes it essential that everything possible be done to avoid unnecessary drains upon components, facilities, feed stocks, and labor usable by both programs.

(4) It has become evident that some of the large butadiene manufacturing units may ultimately run at more than their originally rated capacity. It is possible that by the end of 1943 the alcohol butadiene plants may produce 55,000 to 110,000 tons more butadiene a year than their rated capacity.

Consequently, it has seemed advisable to cancel some of the more recently approved conversions which could not be expected to contribute much, if any, "quick" butadiene needed during the summer and early fall of 1943.

Though no doubts now exist as to the workability of the Houdry Process, transportation difficulties incident to the location of certain partly built plants and the difficulty of procuring certain units made it necessary to cancel the contemplated conversions at Wood River, Ill., Beaumont, Tex., and some others.

Even though experience should prove the canceling of these conversions to have been an unwise move, the demand for component parts should be so much less by early fall that other steps could then be taken which would not delay their share of the program for more than a month or two, and would still provide the butadiene needed in 1944.

The accompanying Table 2 shows the effect of these developments on the butadiene part of the program.

TABLE 2. PRESENT BUTADIENE PROGRAM (United States Only)

Basic Process	Rated Capacities in Terms of Butadiene, Short Tons
From—	
Alcohol	220,000
Butane	75,000
Butene by dehydrogenation	265,100
Naphtha cracking (refinery conversion)	96,760
Total	656,860

The rated capacity of the plants now contemplated will produce enough butadiene to make 761,900 long tons of Buna S. Though the Baruch Committee recommended providing enough butadiene for 845,000 tons of Buna S a year, it is not now planned to authorize any further plants except those to produce the recommended 30,000 tons a year from grain. In view of the present shortage of critical components, the possibility that many of the plants will run at better than rated capacity makes it unwise to start new plants until some experience has been gained from those nearing completion.

Reductions have also been made in the neoprene and Butyl programs. Neoprene has been reduced from the recommended 60,000 long tons to 40,000 and Butyl from 132,000 long tons to 68,000. The reasons for these reductions are:

(1) There may be a sufficient excess of butadiene by the Winter of 1944 to permit a replacement of these tonnages with Buna S.

(2) Further testing and experience have indicated to the military authorities that, except as a last recourse, neoprene and Butyl will not be used for military tires.

(3) The need for isobutylene in the high-octane program is more urgent than its use in Butyl rubber.

The Baruch Committee also recommended additional plants for styrene and copolymerization. None has been started. It is believed that there may be enough over-capacity in the present plants to balance the existing program without further complicating the parts situation. Because of the scarcity of components, new plants, in any case, could not be completed before the Fall of 1943. Here again it seems best to use the experience to be gained from plants now nearing completion before starting new plants.

Therefore, the present rubber program in terms of rated capacities is as shown in Table 3.

TABLE 3. PRESENT SYNTHETIC PROGRAM NOW BUILDING, UNITED STATES ONLY (Long Tons per Year Capacity)

	Baruch Committee Recommendations	Now Building (Rated Capacity)	% of Committee Recommendations Now Building
Buna S......	845,000	705,000	83
Neoprene....	60,000	40,000	67
Butyl........	132,000	68,000	52
Total......	1,037,000	813,000	78

Plants are now being built to make enough butadiene to produce 761,900 tons of Buna S, and enough styrene to produce 798,600 tons of Buna S.

The accompanying map shows the approximate location of these plants. This map and Exhibit B further emphasize the necessity of determining the rate at which the various plants will produce or consume butadiene and styrene, and the transportation problems involved, before new plants are built fully to balance the program.

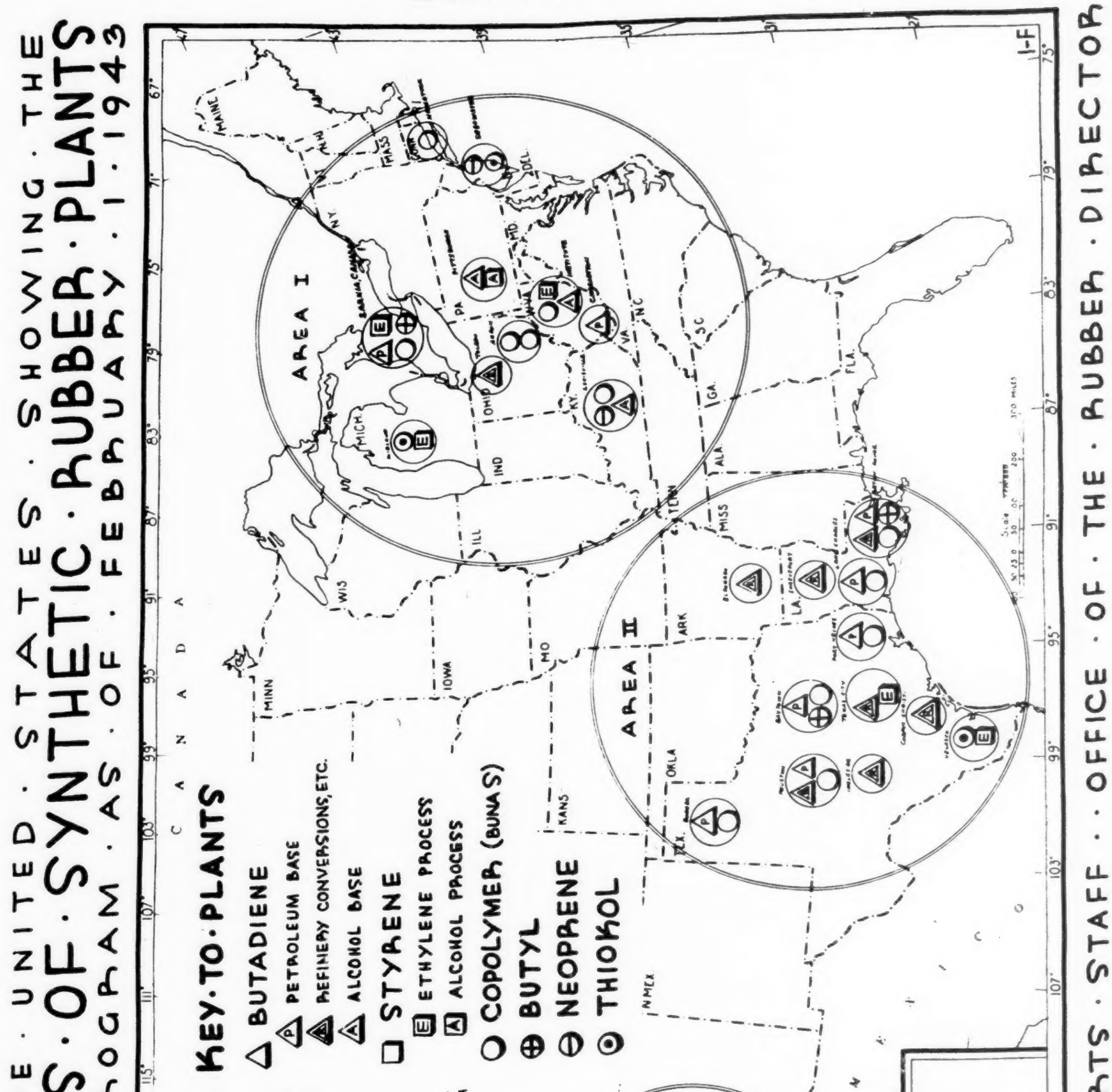
Plant Construction

In Progress Report No. 1 (Page 5, column 1) I said, "Present indications are that the impact of competitive programs will cause a delay. It is too early to say how much of a delay. A scheduling mechanism, now being put into effect, may solve part of the problem. . . ."

This scheduling mechanism is the "directive." This is not a super priority. It is

[1] INDIA RUBBER WORLD, Oct., 1942, pp. 57-58.
[2] *Ibid.*, Jan., 1943, pp. 398-401, 418.
[3] *Ibid.*, Aug., 1942, p. 475.

EXHIBIT "A"



designed to fulfill several essentials: it requires suppliers to furnish materials *only* at the latest date on which it is possible to install them in an orderly fashion, it prevents the misuse of high priorities *to accumulate* critical materials in advance of needs at the expense of other programs, and it permits the proper authorities to balance the various essential programs that compete for the same components or facilities. It has proved to be an effective "bottle-neck-buster."

On December 4, 1942, part of the program was given urgency numbers and directives, with an understanding that, in order to complete the necessary plants, a further increment would be given the same treatment one month later.

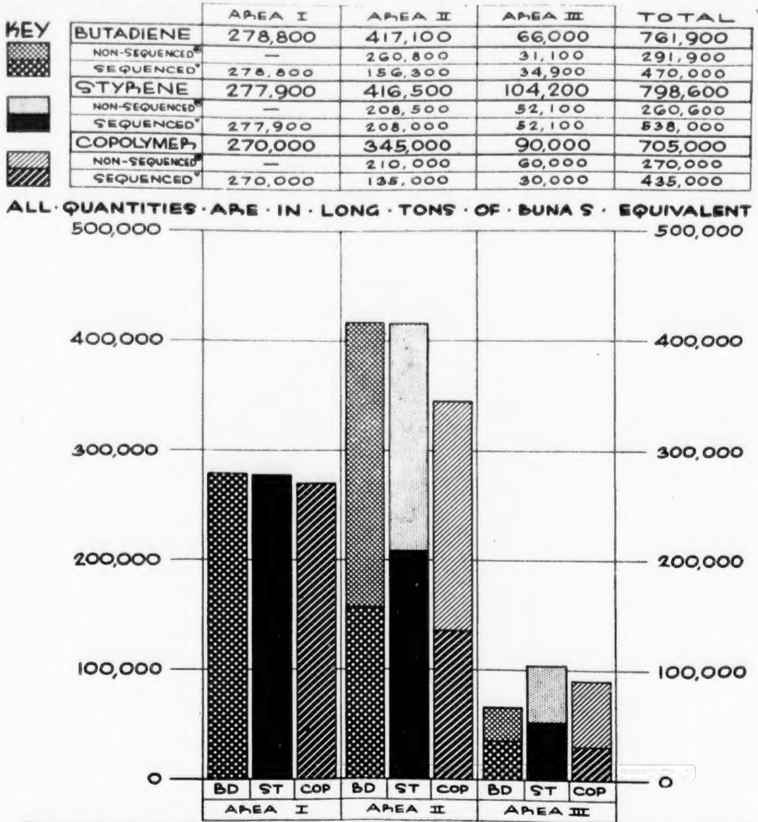
EXHIBIT "B"

RATED · ANNUAL · CAPACITIES · BY · AREAS * · OF BUTADIENE · STYRENE · AND · COPOLYMER · FACILITIES

* UNITED STATES ONLY (EXCLUDING SARNIA CANADA) · FOR · PLANTS · IN · EACH · AREA · SEE · MAP · CHART · #72

	AREA I	AREA II	AREA III	TOTAL
BUTADIENE	278,800	417,100	66,000	761,900
NON-SEQUENCED●	—	260,800	31,100	291,900
SEQUENCED▾	278,800	156,300	34,900	470,000
STYRENE	277,900	416,500	104,200	798,600
NON-SEQUENCED●	—	208,500	52,100	260,600
SEQUENCED▾	277,900	208,000	52,100	538,000
COPOLYMER	270,000	345,000	90,000	705,000
NON-SEQUENCED●	—	210,000	60,000	270,000
SEQUENCED▾	270,000	135,000	30,000	435,000

ALL · QUANTITIES · ARE · IN · LONG · TONS · OF · BUNA S · EQUIVALENT



▾ "SEQUENCED" INCLUDES COMPLETED PLANTS AND THOSE ASSIGNED W.P.B. SPECIAL DIRECTIONS WITH URGENCY NUMBERS
● "NON-SEQUENCED" INCLUDES ALL OTHER PLANTS IN PRESENT PROGRAM NOW BUILDING

OFFICE · OF · THE · RUBBER · DIRECTOR

CHART · NUMBER · 74 FEBRUARY · 1 · 1943

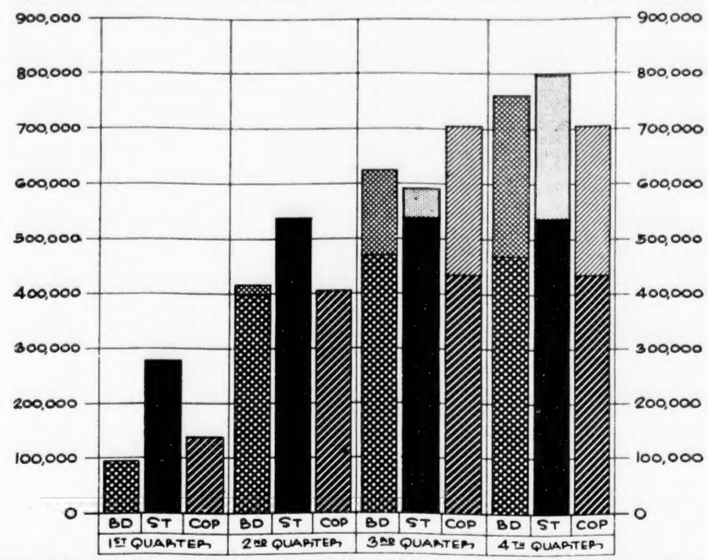
EXHIBIT "C"

ACCUMULATED · RATED · ANNUAL · CAPACITIES OF · BUTADIENE · STYRENE · AND · COPOLYMER FACILITIES * · BY · QUARTERS · FOR · YEAR · 1943

* UNITED STATES · PLANTS · ONLY (EXCLUDING SARNIA CANADA)

	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
BUTADIENE	94,600	415,600	622,800	761,900
NON-SEQUENCED●	—	17,100	152,800	291,900
SEQUENCED▾	94,600	398,500	470,000	470,000
STYRENE	278,100	538,000	590,900	798,600
NON-SEQUENCED●	—	—	52,900	260,600
SEQUENCED▾	278,100	538,000	538,000	538,000
COPOLYMER	137,500	405,000	705,000	705,000
NON-SEQUENCED●	—	—	270,000	270,000
SEQUENCED▾	137,500	405,000	435,000	435,000

ALL · QUANTITIES · ARE · IN · LONG · TONS · OF · BUNA S · EQUIVALENT



▾ "SEQUENCED" INCLUDES COMPLETED PLANTS AND THOSE ASSIGNED W.P.B. SPECIAL DIRECTIONS WITH URGENCY NUMBERS
● "NON-SEQUENCED" INCLUDES ALL OTHER PLANTS IN PRESENT PROGRAM NOW BUILDING

OFFICE · OF · THE · RUBBER · DIRECTOR

CHART · NUMBER · 77 FEBRUARY 1 · 1943

On January 29, 1943, a further determination was made of this matter.

As of today, plants now sequenced and under directive, together with those finished or expected to be finished during the next few months, have total rated capacities of 452,000 tons of synthetic rubbers a year, or 43.6% of the 1,037,000 tons recommended by the Baruch Committee. (See Table 4 and Exhibit C.)

It should be noted that Table 4 shows only that portion of the program under Directives and the plants which have been built or are about to be finished without such directives (43.6%); whereas Table 3 shows the entire building program, including plants being erected with lower priority ratings.

Because the manufacture of butadiene and styrene involves at least a dozen processes, many of which are unproved, it has seemed wise to provide greater raw material capacity than for copolymerization. Also, because of the size of units and geographical

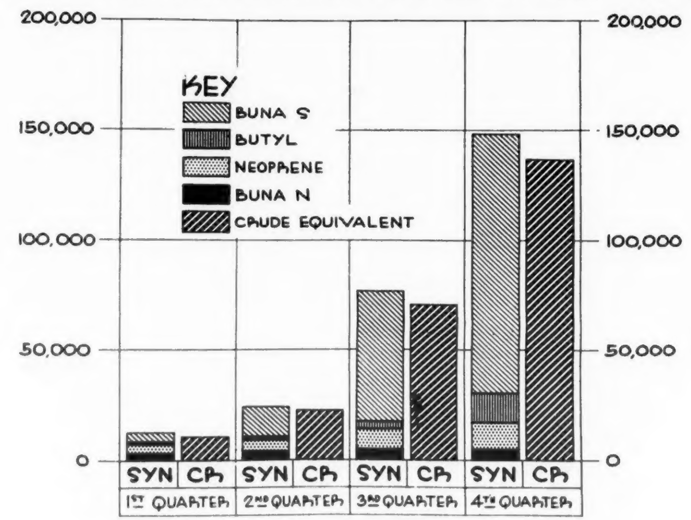
EXHIBIT "D"

1943 · ESTIMATED · QUARTERLY · PRODUCTION* · OF SYNTHETIC · RUBBER · SHOWING · CRUDE · EQUIVALENT FOR · BUNA S · BUTYL · NEOPRENE · AND · BUNA N

* INCLUDES · NEOPRENE AND · BUNA N · CAPACITIES · OF · PRIVATE · PLANTS

1943	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YEAR TOTAL
BUNA S	3,800	13,900	59,500	118,000	195,200
BUTYL	100	1,500	3,300	13,500	18,400
NEOPRENE	4,400	4,900	9,100	12,000	30,400
BUNA N	2,900	3,900	4,800	4,800	16,400
TOTAL SYNTHETIC	11,200	24,200	76,700	148,300	260,400
CRUDE EQUIVALENT	10,800	22,900	70,700	136,600	241,000

ALL · QUANTITIES · ARE · ESTIMATED · IN · LONG · TONS



OFFICE · OF · THE · RUBBER · DIRECTOR
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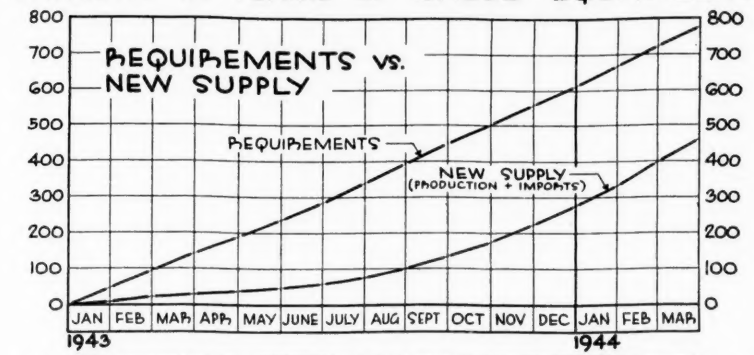
EXHIBIT "E"

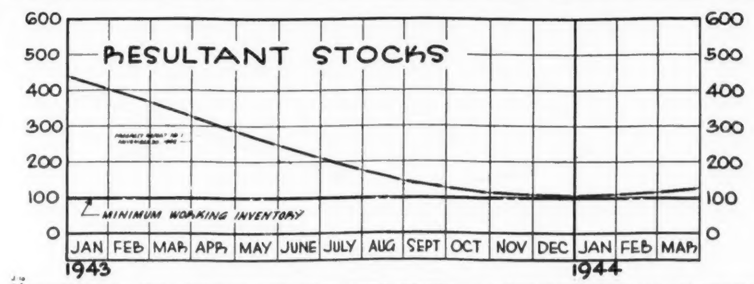
SUPPLY · OF · RUBBER · VS · ESSENTIAL REQUIREMENTS · UNITED · STATES · AND CANADA · JANUARY · 1943 · TO · MARCH · 1944

NOTES
1 · INCLUDES CRUDE, BUNAS, BUTYL, NEOPRENE & BUNA N
2 · RECLAIM AND THIOKOL EXCLUDED
3 · ALL DATA ARE ON A CUMULATIVE BASIS
4 · RESULTANT STOCKS OBTAINED BY SUBTRACTING DIFFERENCE BETWEEN REQUIREMENTS AND SUPPLY FROM INITIAL STOCKS OF 440,000 TONS

IN · THOUSANDS · OF · LONG · TONS · OF · CRUDE · AND/OR SYNTHETIC · IN · TERMS · OF · CRUDE · EQUIVALENT



	JAN 1943	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN 1944	FEB	MAR	
REQTS.	47	95	142	190	237	286	340	394	448	502	557	612	667	722	777	REQTS.
SUPPLY	9	21	29	37	46	57	75	100	134	175	223	276	334	397	464	SUPPLY
STOCKS END OF MONTH	402	366	327	287	249	211	175	146	126	113	106	104	107	115	127	STOCKS END OF MONTH



OFFICE · OF · THE · RUBBER · DIRECTOR
CHART · NUMBER · 70 FEBRUARY · 1 · 1943

location, slightly more styrene capacity is available than its counterpart, butadiene.

Expected 1943 Production

As a result of the many delays which have beset the program, we now estimate that the expected capacity that will come into production during the various months of 1943 will produce only a total of 241,000 long tons (equivalent crude value) of synthetic rubber, instead of the 354,000 tons envisioned in Progress Report No. 1. This includes 3,000 tons from a Canadian plant.

This estimate is based on a consideration and weighing of both conservative and optimistic production rates. However, it must be remembered that it is an estimate which will eventually be proved wrong one way or another.

In addition to small amounts of butadiene being made in small private plants, the first of eleven Government-financed units for making butadiene from alcohol and a unit for making butadiene from petroleum have

started production. It is contemplated that the first Government-financed plant for the production of styrene will soon start operations.

Exhibit D accompanying this report shows the quarterly production estimates for each type of rubber which goes to make up the total of 241,000 tons for the whole year.

TABLE 4. PLANTS UNDER DIRECTIVES I & II. UNITED STATES ONLY*

(Long Tons Rated Annual Capacities)

	Baruch Report Recommendation	Now under Directive	% of Capacity Recommended by Baruch Committee, Now under Directive	% of Total Committee Program
Buna S...	845,000	435,000	51.5	41.9
Butyl.....	132,000	7,000	5.3	.7
Neoprene.	60,000	10,000	16.6	1.0
	1,037,000	452,000	43.6†	43.6
In Terms of Buna S (82% of Synthetic Program)				
Butadiene.	845,000	470,000	55.6% x 82% = 45.6%	
Styrene...	845,000	538,000	63.5% x 82% = 52.1%	

*These include plants now built or presently finishing without directives

†Weighted average.

Program Summary

The Rubber Program involves three major problems:

(1) To bring into production, as rapidly as possible, enough synthetic rubber capacity to balance supply and demand before ever-dwindling stocks have declined to a critical minimum.

(2) To maintain enough of the natural crude stockpile to make heavy-duty military tires, self-sealing tanks, and other military items for which synthetic rubber is not yet adequate.

(3) Further to increase the capacity of the synthetic rubber industry and to develop all possible quick sources of natural rubber to take care of the additional needs in 1944. These 1944 needs include:

(a) Added requirements of our Allies as their inventories disappear.

(b) Replacement of depleted inventories of necessary industrial equipment, most of which is used in the manufacture of military supplies.

(c) Replacement, during 1944, of essential civilian tires which, after recapping with presently available reclaimed rubber, will have worn out their carcasses by Midsummer of 1944. These are tires upon which the basic economy of the nation depends—the growing, distribution, and marketing of foodstuffs and other essential products, plus the transportation of essential workers to their jobs.

(d) Use of rubber by the military authorities in many essential categories which have been restricted temporarily due to the present stringency.

The above three major problems, while closely intertwined, in a sense are independent of one another. It is the first which has given rise to the demand that highest priorities be given to rush the plants necessary to balance the absolute minimum of immediate consumption with new supply.

Other Sources of Supply

Approximately 440,000 tons of crude rubber were on hand in the United States and Canada on January 1, 1943. Many uncertainties affect estimates of possible imports of crude rubber from various producing areas still in Allied hands, such as ocean transportation hazards, quality of rubbers produced, and amounts actually to be harvested from the many programs now under way in various tropical nations. After estimating the quantities to be shipped to our Allies, and taking all of the other factors mentioned into consideration, it is expected that we can count on receiving, in terms of plantation crude, a new supply of 35,000 tons during 1943.

Requirements

Present estimates of essential 1943 requirements to be filled by rubber from the United States and Canada are:

	Tons
U. S. Military	312,500
Commercial vehicles	65,000
Sundry industrial, indirect military, and civilian	41,000
Canadian	47,500
Export (as finished goods)	105,000
British deficiency (Buna S)	41,290
	612,290

Several explanations of this tabulation are desirable:

(a) Every request for rubber is given a most searching analysis, and reductions are made whenever it is possible without seriously interfering with the war effort. Until the synthetic production is a reality, present inventories of finished rubber goods will continue to be used wherever possible to meet requirements and so to conserve the crude rubber stockpile. To the extent that this procedure runs down still further those inventories which are already depleted, synthetic rubber will have to be used later in the year to replace these exhaustions and return inventories to at least working levels.

(b) The military forces (Army, Navy, Air Corps, Maritime Commission) have cooperated in reducing their use of rubber, and it is hoped that rubber production can be stepped up enough, at an early date, to make available enough rubber so as to fill their needs for many essentials, such as tank treads, shoe soles, rubber soles, etc., that have been given up during the period of extreme stringency.

(c) The heavy load being placed on bus and truck tires requires the use of new rubber for such equipment. The war effort requires an efficient internal transportation system, of which passenger buses and trucks are an integral part. No further loads can be placed on other methods of transportation without serious economic results. A wartime trend toward maximum loading has increased wear of tires per mile.

(d) Forty-one thousand tons have been allocated to industrial and civilian uses. Of this total, 3,000 tons, or less than one-half of one per cent of the year's estimated consumption, will be used for bonding reclaimed tires for recapping. Some quantities are provided for items essential to the public health such as drug sundries and footwear, with most of the balance going to indirect military uses such as mechanical goods, cable and wire, hose and beltings.

(e) Canada's total requirements are divided much in the same way as are those of the United States, with the military program taking the bulk of the available supplies.

(f) Export requirements are for Lend-Lease orders manufactured in the United States and for items to be exported by the Board of Economic Warfare. All are part of the war effort.

(g) The British deficiency is the total amount of rubber which we must ship to the British Empire to maintain a safe supply on hand in its manufacturing plants, over and above its present inventory and expected crude imports. This safe working inventory in Great Britain is now considered 50,000 tons instead of 66,000 tons originally recommended by the Baruch Committee.

(h) Progress Report No. 1 considered only the Canadian deficiency rather than Canada's full needs. It also did not include the requirements for Buna N.

Balance

The estimated resultant stocks are shown graphically in Exhibit E. With supplies of 716,000 tons and requirements of 612,000 tons, it is estimated that we shall be left 104,000 tons on January 1, 1944. This is too low for comfort.

It is essential that the rubber manufacturing plants maintain an inventory of at least 100,000 tons or face closing down, with resultant dispersal of highly trained manpower.

It is also important that substantial quantities of natural crudes be kept for use with synthetics.

Therefore, this 100,000-ton working inventory is the irreducible minimum below which stocks cannot fall without a critical dislocation of the entire military, industrial and civilian economies.

The presently expected most critical period is from October, 1943, to March, 1944, with December the low point; thereafter supplies should exceed consumption.

This forecast, of course, is subject to change during the next six months. If all synthetic plants come into production without undue difficulties, and if their output should exceed their rated capacities, we may be in a better position. The reverse could happen.

Natural Crude Rubbers

Every effort is being made to develop all possible sources of natural rubber which give promise of producing supplies in 1943 and early 1944. Certain developments have been fostered for harvesting after 1944, but only as insurance for the future. Some of the more important of these activities can be mentioned:

(1) The Rubber Reserve Co., in agreement with the Governments of Brazil, Peru, Bolivia, and Colombia, is pursuing a broad development in the Amazon Basin. While substantial quantities of crude rubbers once came from the Amazon, competition from the Far East has resulted in a decline of rubber procurement in this area. The present program calls for the movement of large numbers of workers, with attendant facilities, into the Amazon, and it is hoped that substantially larger quantities of rubber will be produced than heretofore.

(2) The Board of Economic Warfare and the Rubber Reserve Co. have combed the rest of Latin America for wild rubbers, and some importations are expected in the 1943 year.

(3) The *cryptostegia* development in Haiti originally proposed by the Board of Economic Warfare in conjunction with the Government of Haiti, is showing progress. Preliminary indications are that this plant provides a very good grade of rubber, but that small tonnage can be expected until well after mid-summer 1944.

(4) The guayule program, operated by the Department of Agriculture, is expected to produce less than 1,000 tons of rubber in 1943, but should produce substantially more in 1944.

(5) The Department of Agriculture is continuing its experiments with *koksaghyz* (Russian dandelion) and goldenrod. It appears doubtful that either program will be extended in the immediate future because either would create substantial displacement of food crops, use of critical materials, and use of large manpower.

The efforts of Government agencies are being directed primarily toward increasing rubber production from all sources now

available throughout the world. The estimate of imports of 35,000 tons is on the basis of "equivalent plantation crudes" and the efforts referred to may well produce quantities in excess of present estimates.

Despite all of these projects, however, this country cannot hope to get as much rubber from these sources in 1943 as it could from the early completion of one or two of the principal synthetic plants.

Authority and responsibility for acquiring natural crude rubber from Latin America has been delegated to the Rubber Reserve Co., and the responsibilities of both that company and the Board of Economic Warfare in the Rubber Program have been delineated.

Operations

Among the activities of this branch during the past two months have been studies of rubber requirements of all claimant agencies and of processing machinery within industry; and bringing up to date statistical information on all matters pertaining to the production and use of rubber and rubber products. Steps have been taken to relieve some of the burden upon industry by eliminating reports not essential to the work of this office. Priority problems of maintenance and repair materials for plants have been followed and expedited.

The essential functions formerly handled by the Rubber Division of the Office of Civilian Supply, W. P. B., have been carried out and there have been organized eight product groups to supervise consumers' rubber requirements.

The use of recaps and recapping equipment has been supervised in order to assure the public the best possible results from the rubber allocated for its use.

The production of reclaimed rubber has been increased in order more nearly to meet military and civilian requirements.

Problems incident to the effect of the higher cost of synthetics upon the cost of rubber goods are being studied and worked out with the Office of Price Administration and the Rubber Reserve Co. It is hoped that decisions may be reached in the very near future.

Rationing

Progress has been made in simplifying rationing regulations further to conserve rubber and to facilitate the securing of available rubber by those eligible, and in improving interpretations of gasoline rationing procedures, etc.

Russian Mission

As recommended by the Baruch Committee, a mission of technical experts left for Russia in early December. Cabled reports indicate that this mission is gathering valuable information and will return with a full report sometime in March.

Pilot Plants

Several pilot plants intended to produce butadiene from agricultural products and petroleum are in various stages of technical development. While some have been delayed because of the shortage of component parts and fabricating facilities, it has been possible to rearrange schedules and to move parts to other fabricators, so that an early completion of the principal pilot plants is now fairly well assured. The translation of certain promising processes into actual plant construction depends, of course, upon results of these piloting operations.

Technical Developments

Our technical staffs have been active on two broad fronts:

(1) The solution of problems in the production of synthetic rubbers and the improvement of their quality, and investigation of the many processes involved.

(2) The conversion of the rubber manufacturing industry to the use of synthetics as rapidly as these become available.

The industry has cooperated closely with our staff in every way and, particularly, by the generous support of its leading technologists in technical meetings on alcohol, petroleum and rubber, thus functioning in a most heartening manner on every possible problem connected with synthetic rubber production.

With the aid of the most recent and best informed advice, it has been possible to re-appraise the merits of the various synthetics. Buna S still appears to be the best all-purpose rubber, and its processing is much improved. On the other hand, some special synthetics, such as "Norepol" and "Arapol" [Agripol?] may be set aside due to shortages in the specific food products used by them. "Thiokol" will probably be used primarily in recapping civilian tires and for a few specialty uses not filled in the past by rubber. For this reason, neither production nor consumption of this product is included in the over-all figures of the program.

The needs for rubber are being relieved by the use of certain synthetic resins now becoming available and by the substitution of reclaim rubber and rubber-extenders in many products.

Close cooperation has existed with the various divisions of the Army and Navy on specifications and conversions with valuable results. With their aid and with the help of industry, tire tests of all descriptions are being continuously conducted, to determine the best use of synthetics when they become plentiful.

Meanwhile, extensive research programs in many of the technical fields are under way in a number of universities and colleges throughout the country, and a broad basis for exchange of research information is being developed, which should be of great benefit to the rubber program.

With continued cooperation of all concerned I hope within the next few months to be able to make a more encouraging report.

W. M. Jeffers
Rubber Director

War Production Board
February 18, 1943.

Rubber Reserve Co. Circulars

Circular No. 14 on Experimental Lots of Guayule

It is the policy of the Office of the Rubber Director and the Rubber Reserve Co. to provide rubber processors with an opportunity to become familiar with the use of guayule as a substitute for other types of crude rubber. In furtherance of this policy, an amount up to 25 pounds of guayule will be made available to any processor who desires to experiment with this material in the manufacture of items for which crude rubber may be consumed under the provisions of Supplementary Order M-15-b, as amended.

An application for guayule to be used in such experimentation should be filed with the Office of the Rubber Director setting out the pertinent facts on Form PD-500-B. Upon receipt of this application the Office of the Rubber Director will authorize consumption for experimental purposes in addition to all other quotas which may have been established for the rubber processor, and instruct Rubber Reserve Co. to issue the necessary purchase permit.

Rubber Reserve Co.'s present selling price for guayule is 17½¢ per lb. basis F.O.B. cars New York for carload lots and 18¢ per lb. basis F.O.B. cars New York for less than carload lots.

Circular No. 15 on Balata

In accordance with the procedure outlined in our Circular No. 11,[1] Rubber Reserve Co., effective February 1, 1943, will sell Balata to manufacturers, ex dock or ex warehouse at port of entry or F.O.B. cars at port of entry or ex warehouse at any inland points at the option of Rubber Reserve Co. on the basis of the prices listed below provided, however, that in the case of sales, ex warehouse at any inland point, there will be added to the listed price an amount equivalent to the freight charges advanced by Rubber Reserve Co. in moving the Balata to such warehouse.

Grade	Price
Surinam Sheet	$0.42½
Venezuelan Block	.40¼
Manaos Block	.38¾
Colombian Block	.38¾
Panama Block	.38¾
Peruvian Prime	.38¾
Chicken Wire	.23¼
Coquirana Washed and Dried	.23¼
Coquirana Crude	.19½
Peruvian F. A. Q.	.19½
Massaranduba Washed and Dried	.17¼
Massaranduba Crude	.14¼

Circular No. 16 on Revised Procedure in Connection with the Sale of Crude Rubber, Liquid Latex, and Balata

1. Effective upon receipt of this Circular, all requests by manufacturers for the issuance of permits authorizing the purchase of crude rubber, liquid latex and balata are to be addressed to the Office of the Rubber Director, War Production Board, rather than to the Sales Department of Rubber Reserve Co., as has been the custom heretofore.

2. There is attached hereto a sample form which is to be used by manufacturers under the new procedure. This form should be executed in quadruplicate, and forwarded to the Office of the Rubber Director. (It will be necessary for the manufacturer to draft its own forms, since a supply thereof is not available for distribution.) If the request is approved, appropriate advice will be furnished Rubber Reserve Co., and purchase permits will be issued and mailed to

[1] See India Rubber World, Dec., 1942, p. 297.

the manufacturer without delay. It is possible that in some cases the request will not be approved as submitted, and in these instances, the amount of crude rubber, liquid latex or balata specified in the purchase permit will represent the action of the Rubber Director.

3. For the present, there will be no change in the existing method of distributing crude rubber, liquid latex and balata to manufacturers, pursuant to purchase permits, and the activities of the Distributing Agent in New York City and the Liquid Latex Agents of Rubber Reserve Co. will not be affected by the new procedure.

4. In our Circular No. 10, dated September 23, 1942,[2] the attention of all manufacturers was called to the necessity of utilizing lower grades of rubber which are subject to deterioration, in order that the grades most suitable for admixing with synthetic rubber might be conserved to the greatest extent possible. It was hoped that this problem would be solved through voluntary action on the part of manufacturers, but requests for the purchase of rubber since September 23, 1942, and subsequent sales, have failed to accomplish the desired result.

5. It now becomes necessary to take definite steps to protect and balance the stock pile, and in view of this fact, effective with sales of crude rubber authorized by purchase permits issued subsequent to the date of this circular, manufacturers will be required to accept the types and grades of rubber which are available, rather than the types and grades which they prefer to use in their manufacturing processes.

6. Based upon the relation of certain types and grades of rubber to the entire amount of available rubber in the stock pile, a formula will be developed and applied to requests received from manufacturers. Under this procedure, manufacturers will receive a certain percentage of various types and grades of plantation rubber as well as wild rubbers to cover their consumption requirements. Therefore, purchase permits issued to manufacturers under the new procedure will reflect only the total amount authorized by the Rubber Director.

7. In so far as is practicable, full consideration will be given to each manufacturer's request for specific types and grades of rubber, but no assurance can be given that the types and grades requested will be available for delivery.

8. In cases where manufacturers request permits authorizing the purchase of liquid latex, the following detailed information for each lot desired should be included in the request:

[2] *Ibid.*, p. 296.

Type:
Normal........................ Creamed........................ Centrifuged........................
Pounds Total Dry Latex Solids ....
Percentage of Concentration ....
Type of Container..
For Delivery in One Lot During the Month of .... 194....
Indicate Specific Use ....
Usual Source of Supply..

9. This circular has the approval of the Office of the Rubber Director.

REQUEST FOR PURCHASE OF CRUDE RUBBER, LIQUID LATEX AND BALATA

Office of the Rubber Director,
War Production Board,
New Municipal Building,
Washington, D. C.

Attention: K. D. Fernstrom

Gentlemen:

I, ... do hereby certify that I am
(Name)
.... of ....;
(Title or Position) (Name of Manufacturer)
that said manufacturer will require.

Types of Rubber	Crube Rubber	Liquid Latex	Balata
Pounds Requested			
Pounds Authorized			

to be delivered during the month of .... 194....

This request and our present inventories will be used under the provisions of Supplementary Order No. M-15-b, as amended, issued by the War Production Board or other official instructions of the War Production Board; that such materials, together with inventories now on hand, are to be used for the manufacture of such products and for no other purpose; that the materials which said manufacturer will use, consume or process will not exceed the limitations upon the use, consumption or processing imposed by said Supplementary Order No. M-15-b, as amended, and any other instructions issued by the War Production Board. I further certify that, at the end of the period referred to above, total stocks on hand will not be in excess of a sixty day working inventory or such other limitations as may be established by order of the Rubber Director.

The following types and grades of crude rubber, liquid latex and balata are requested if available:

....
(Signature)

Subscribed and sworn to before me this .... day of ...., 194....

....
(Notary Public)

IMPORTANT: *All requests for the purchase of crude rubber, liquid latex and balata must be in the office of the Rubber Director prior to the 15th day of the month preceding the month during which delivery is desired.*

February 12, 1943.

GR-S Tires

MEMORANDUM

To: All Tire and Inner Tube Manufacturers

FROM: H. E. Simmons
Office of the Rubber Director

SUBJECT: Accelerated Indoor Wheel Tests

The attached pages *222-2* to *222-5*, dated February 8, 1943, relate to page *222*, dated January 4, 1943, on Indoor Wheel Tests,[1] but do not supersede that page in any way.

Accelerated Indoor Wheel Tests

Many indoor wheel tests on pneumatic tires are now being made in accordance with Bureau of Standards specification procedure, or some modification thereof. While this practice is satisfactory in normal times, nevertheless at present when the progress of GR-S tire development must be hastened as much as is possible consistent with accurate testing, it is believed that accelerated tests which may quickly bring out specific tire defects may be beneficial in speeding up tire development programs.

Accordingly there is being set forth herewith a number of these accelerated tests from which the tire manufacturers may select those that are adaptable to their own indoor wheel equipment. Each one of these suggested methods is now in use in one or more tire plants, and all of them give comparative test data satisfactory for the specific failures as indicated.

For the purpose of reporting tire tests to WPB any one of the accelerated methods now being suggested is acceptable, provided, of course, that results are reported in terms of a control tire as originally requested on page *222* of the bulletin dated January 4, 1943.

FAILURE TESTED FOR: HEAT BREAK

METHOD A. STEP-SPEED

This method is effective where wheel is capable of high speeds, i.e., 60 m.p.h. or higher.

Tire Size	7.50-20 (8)	9.00-20 (10)
Load	145% of Std. T&R	130% of Std. T&R
Inflation, Starting	55 lbs./sq. in.	65 lbs./sq. in.
Inflation, Running	Allowed to build up	
Speed	25 m.p.h. + 6 m.p.h. every 6 hours to failure	
Drum Type	Smooth	

METHOD B. HIGH INFLATION

Tire Size	7.50-20 (8)	9.00-20 (10)
Load	145% of Std. T&R	130% of Std. T&R
Inflation, Starting	100 lbs./sq. in.	125 lb./sq. in.
Inflation, Running	Constant, checked approximately every 8 hours	
Speed	Constant at 45 m.p.h. after 3-hour break-in period at 25 m.p.h.	
Drum Type	Smooth	

METHOD C. STEP-LOAD

Tire Size	Any
Load	Standard T&R at start, increased by 15% of standard every 500 miles
Inflation, Starting	Standard T&R
Inflation, Running	Constant, checked approximately every 8 hours
Speed	Constant at 35 m.p.h.
Drum Type	Smooth

FAILURE TESTED FOR: SEPARATION

METHOD A. LOW INFLATION

Tire Size	7.50-20 (8 ply)
Load	1850 lbs.
Inflation, Starting	30 lbs./sq. in.
Inflation, Running	Constant
Speed	Constant at 40 m.p.h.
Drum Type	Cleated

[1] INDIA RUBBER WORLD, Feb., 1943, pp. 497-498.

METHOD B. STEP-DOWN INFLATION

Tire Size	7.50-20 (8 ply)
Load	1850 lbs.
Inflation, Starting	55 lbs./sq. in.
Inflation, Running	Pressure reduced 5 lbs. every 24 hours to failure
Speed	40 m.p.h.
Drum Type	Cleated

METHOD C. STEP-LOAD

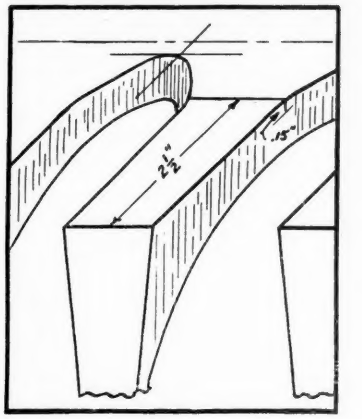
Tire Size	7.50-20 (8 ply)
Load	1600 lbs. at start, raised 200 lbs. every 24 hours to failure
Inflation, Starting	55 lbs./sq. in.
Inflation, Running	Constant
Speed	40 m.p.h.
Drum Type	Cleated

FAILURE TESTED FOR: CUT GROWTH

Tire Size	7.50-20 (8) Non-Directional
Load	1850 lbs.
Inflation, Starting	55 lbs./sq. in.
Inflation, Running	Constant
Speed	45 m.p.h.
Drum Type	Cleated

Circumferential cuts are made as shown in the accompanying sketch across every other lug on each side of the tread. The cuts are 2.5 inches in from the edges of the lugs and 0.15-inch deep. Periodically the depths of the cuts should be measured, averaged and recorded.

The tires for this test should preferably have composite treads consisting of a control stock (either rubber or synthetic) and one or two experimental stocks. The cut growth of the experimental stocks is then related to that of the control. Care must be taken to have uniform distribution of the uncured tread slabs of all stocks so that the inflated radius of all sections is essentially the same. Otherwise the comparisons will be erratic or inaccurate.



Tentative Specifications for GR-S

MEMORANDUM

To: Consumers of Government Synthetic Rubber

FROM: H. E. Simmons, Office of the Rubber Director

SUBJECT: Rubber Reserve Co. Tentative Specifications for GR-S.

For your information we are attaching copy of the Rubber Reserve Co. Tentative Specifications for GR-S to be manufactured in Government owned plants. These specifications are as of February 6, 1943.

The issuing of these specifications by this Office does not imply any change in the test methods or analytical methods previously issued by this Office; namely, pages 111-2, 111-3, 111-4, dated September 1, 1942.

War Production Board
Washington, D. C.
Office of Rubber Director
February 22, 1943

Rubber Reserve Co. Tentative Specifications for GR-S To Be Manufactured in Government-Owned Plants

Specifications Are as of February 6, 1943

Chemical Composition

	% Min.	% Max.
Acetone extract	—	10
Heat loss	—	0.75
Fatty acid (as stearic acid)	3	6
Soap (as sodium stearate)	—	1
Ash	—	1.5

Plasticity

Mooney Viscosity at 212° F.	45 to 60

The viscosity shall be determined in a Mooney plastometer at 212° F., using the large rotor. The warm-up period shall be one minute, and the reading shall be taken 1½ minutes after the motor has been started.

February 22, 1943.

Rubber Reserve Co. Tentative Specifications for GR-S To Be Manufactured in Government-Owned Plants

I. Sampling

A. For control purposes, rubber is to be samples from the drier using a minimum of four pounds total sample weight. This weight to be obtained through blending of a minimum of four samples taken every two hours, each of which is not less than one pound. Blending of these samples is to be made on a cool mill according to Crude Rubber Committee procedures and on ASTM specified equipment. Sampling by consumers is to be done according to methods recommended by Crude Rubber Committee of the American Chemical Society.

B. SAMPLE DISTRIBUTION

1. Chemical analysis ½ pound
2. Physical testing 1 pound
3. Stocked sample 1 pound (Sample to be kept one month maximum)
4. All unused sample to be returned to process.

II. Chemical Analysis

TEST	SPECIFICATION
A. Acetone extract	10% maximum
B. Heat loss	0.75% maximum
C. Fatty acid (as stearic acid)	3.0 to 6.0% max.
D. Soap (soluble—sodium stearate)	1.00% maximum
E. Ash	1.5% maximum

Analytical Methods

A. ACETONE EXTRACT. The extraction apparatus used shall be of the type described in ASTM D-297-41T. The flask shall be heated so that the period of filling an empty siphon cup with acetone and completely emptying it will be between 2.5 and 3.5 minutes.

Place two grams of rubber in a thimble made by folding a filter paper so that it will fit in the extraction cup, which is suspended in a weighed extraction flask. Extract the sample continuously for 24 hours, unless the solution in the thimble is still colored at the end of that time, when the extraction shall proceed for a further period of four hours or longer. Carefully note all characteristics of the acetone extract, both when hot and cold. Distill off the acetone on a steam bath, recovering the acetone if desirable, at as low a temperature as possible. Loss of extract by bumping can be avoided by means of a gentle current of air. Dry the extraction flask and contents in an air bath for one hour at 70° C., cool, and weigh. Call the residue acetone extract (uncorrected).

$$\text{Percentage of acetone extract, uncorrected} = \frac{\text{Wt. of extract}}{\text{Wt. of sample}} \times 100$$

B. HEAT LOSS.

"a." Approximately two grams of material are accurately weighed into a tared porcelain crucible of 30 cc. capacity, having a top diameter of 45 mm. and a height of 30 mm. which has been ignited in a 1000° C. muffle furnace to constant weight. Place in a 105° C. oven for exactly two hours. Remove, cool in a desiccator, and weigh.

"b." Following the same procedure as in "a", heating losses may be determined also by heating for exactly two hours in a 70° oven.

CALCULATION:

$$\%\ \text{heating loss} = \frac{(A - B)}{C}\ 100$$

A = Wt. of crucible and sample before heating.
B = Wt. of crucible and sample after heating.
C = Wt. of sample.

Save this sample for ash or ignition. No part of the oven used should vary more than 1° C. from the designated temperature.

C. DETERMINATION OF FATTY ACID. Weigh two grams of a thinly sheeted sample or of finely divided crumbs into a 500 ml. wide mouth flask. Add 25 ml. of 2-B-ethanol and 50 ml. of benzene (preferable thiophene free) to the flask, or if the flask is not at least one inch full, add more solvents in the same proportions. Reflux for 30-45 minutes, or allow to stand at room temperature for 16 hours.

Add 8-10 drops of the thymol blue—phenolphthalein indicator and titrate with 0.05-0.1 N NaOH solution to a purple or blue end point that is permanent for at least 30 minutes.

CALCULATIONS:

$$\%\ FA = \frac{\text{ml. NaOH} \times \text{equivalent grams FA per ml.} \times 100}{\text{Weight sample}}$$

D. DETERMINATION OF SOAP. Proceed as for FA up to the addition of the indicator. Add 4-5 drops of 0.1% brom phenol blue solution in 20% alcohol. Titrate with 0.05 N HCl (not H_2SO_4), shaking thoroughly until the indicator changes through green to yellow. The end point taken should be permanent for at least one minute. If more than 3 ml. of acid are used, the solution will form a milky emulsion. The end point is readily seen in this solution, but violent agitation is necessary, and the reaction proceeds slowly.

(*Continued on page* 601)

EDITORIALS

Rubber Situation Has Not Improved

THE impact of new developments of the war both at home and abroad on the rubber program may be seen in Progress Report No. 2 of the Rubber Director, which was made public on February 18. The program for the construction of plants to produce synthetic rubber gives only the assurance of sufficient production for 1943 of the equivalent of 241,000 tons of crude rubber, as compared with the estimated production of 354,000 tons for 1943 as given in Progress Report No. 1. In contrast the requirements for 1943 are 35,290 tons greater than previously estimated. Such a picture is not encouraging, but a consideration of some of the factors that have brought about this change may provide the means of developing suggestions to prevent the situation becoming any worse and also may provide some additional thoughts for improvement.

That the synthetic rubber plant construction program has been curtailed because the demand for component parts which is common to the construction programs for high-octane gasoline, escort vessels, aircraft, and merchant shipping as well as the synthetic rubber plants is, of course, well known by this time. However, why this production was reduced to the point where it is possible that some time between October, 1943, and March, 1944, we may have a stockpile between 100,000 and 0 tons of rubber in view of the effect of such a situation upon the whole war effort is not stated and should be investigated. Estimated consumption during 1943 is at the rate of 50,000 tons a month.

Requirement estimates show a reduction from 325,000 to 312,500 tons for the military, but it is indicated that this is at the expense of what were formerly considered essential military uses. Requirements for commercial vehicles have been increased from 59,000 to 65,000 tons, and it is not difficult to see why this increase is justified. Civilian uses have been decreased from 52,000 to 41,000 tons, but this difference probably can be satisfactorily taken care of by the increased use of reclaimed rubber. Requirements for the rest of the United Nations, including Canada, have been increased from 117,000 to 152,000 tons (105,000 tons as finished goods) with the notation that the original estimate considered only Canadian deficiency rather than Canada's full needs. The increase from 24,000 to 41,290 tons of Buna S to supply the British deficiency probably is another cause for the overall increase in requirements shown to be 35,290 tons. In spite of the fact that it is stated in this connection that the working inventory for Great Britain has been reduced from 66,000 to 50,000 tons, and in spite of the fact that production from Ceylon, which is all probably going to Great Britain, is reported as over 100,000 tons, as compared with 88,000 tons in 1940, an increase of 27,290 tons of our curtailed Buna S production for 1943 has been alloted here. The reason for such a decision is not known, but from the data presented it is difficult to see the logic behind it. One definite probability does exist, and that is if anything happens to reduce our synthetic rubber production by, say, 50,000 tons during 1943, and if our own requirements become greater than estimated, the United States will know definitely what it is to be a "have not" nation as far as rubber is concerned.

The situation calls for an even greater intensification of our efforts along many lines in the hope that (1) we do not reduce our present and future supplies any faster than estimated, and (2) we learn how to make and use lower-quality products. In connection with the first item, there has not been anything said since the Baruch Report in September, 1942, regarding the efficiency of our provisions for safeguarding our natural and reclaimed rubber stockpiles. A review of this situation might be in order, as any loss due to carelessness here would be inexcusable. Production control in rubber manufacturing becomes increasingly important since any losses here due to faulty processing would be the equivalent of the destruction of so much crude rubber. The further use of reclaimed rubber and extenders, which is mentioned in this second Progress Report, will have to be emphasized to an even greater extent. As far as the use of rubber is concerned, the maximum of care and ingenuity are the order of the day.

Classificationof Synthetic Rubber Scrap

DURING the next few years and probably far into the future, depending on whether you belong to the school of thought that believes that the use of synthetic rubbers in large volume is here to stay or for the duration only, scrap rubber will contain increasing amounts of synthetic rubbers. To date no instructions have been made public which would require scrap dealers to separate and indicate whether or not a given grade of scrap contains any synthetic rubber.

Of course synthetic rubbers have been made for some time, and undoubtedly products containing synthetic rubbers have been reclaimed with natural rubber scrap according to existing methods. But what about the effect upon the properties of, say, whole-tire reclaim if the scrap from which it is made may contain anywhere from 1% to 99% of synthetic rubbers? It has been reported that processes have been developed which can reclaim scrap containing mixtures of natural and synthetic rubbers; but how about the properties of the finished reclaim as compared with the properties of the present grades made from natural rubber scrap? A continual variation of properties of the existing grades of reclaimed rubber might add a considerable burden to the already difficult problem of processing synthetic rubbers.

It would seem apparent that new classifications for rubber scrap and new classifications for reclaimed rubber are going to be needed badly within a very short time.

What the Rubber Chemists Are Doing

A. C. S. Activities

Flory and Mark Discuss High Polymers

A REGULAR meeting of the New York Section, A. C. S., at the Hotel Pennsylvania, New York, N. Y., February 5, heard Paul J. Flory, of the Standard Oil Development Co. on "Structure and Molecular Weights of Synthetic Polymers" and H. Mark, Polytechnic Institute, of Brooklyn, N. Y., on "Fundamental Aspects of the Elasticity of High Polymers". The meeting, which was in charge of Chairman Charles N. Frey, was very well attended and included in the audience Per K. Frolich, president of the American Chemical Society, who was introduced to the audience at the beginning of the meeting by Mr. Frey.

Dr. Flory pointed out the common fundamental characteristic of synthetic polymers as plastics, rubbers, and textiles in that they are composed of exceedingly large molecules made by the combination of many smaller molecules called monomers by the process of polymerization. Linear condensation and addition polymers were discussed, and slides were shown to illustrate the reactions of various monomers either with themselves or with monomers of different composition in linking together to form long chain polymers. Polymers consisting of from 20,000 to 200,000 monomeric units joined together in a single chain were mentioned. With condensation polymers, such as polyesters, a relatively simple statistical method can be used to interpret polymer formation, composition, and degradation. In other types of polymers pairs of links in two different chains become united. Profound changes in physical properties are caused by the introduction of a few "cross-links" between the long chains, thus welding them together into giant networks. A mathematical-statistical theory recently has been developed here also which explains the structural effects of the cross-linking of linear polymers, and a brief description of how and under what conditions the chains could become connected was given. The usefulness of this theory in understanding the vulcanization reaction in rubber chemistry as well as changes taking place in the drying of a paint film and the hardening of thermosetting resins was mentioned.

Dr. Mark, in discussing high polymers, said that they indeed can be characterized to a certain degree by the average size and shape of their molecules and that some of these materials are mainly built up by straight chains; while others are branched or cross-linked. It has been found that all natural and synthetic high polymers contain a comparatively wide range of polymerization degrees, a fact which seems of considerable importance for the physical properties of such materials. Also knowledge of the degree of geometrical organization of the molecules and the molecular attraction between the chains may be used to obtain a better understanding of the mechanical behavior of high polymers. Slides of X-ray photo-micrographs of rubbers, plastics, and fibers were used to illustrate the degree of organization of the molecules of these materials and also under what conditions a higher degree of molecular organization was present. A survey of the present experimental knowledge seems to indicate that the difference between typical rubbers (such as natural rubber, Vistanex, neoprene Hycar, or buna), typical plastics (as gutta, vinylite, Lucite, polystyrene, or ethylcellulose), and typical fibers (such as silk, wool, cellulose, or Nylon) is not so much a question of a fundamentally different structure, but much rather a matter of degree in respect to the tendency of these materials to crystalize. If the mutual attraction of the chain-like molecules is low, and/or if they are not favorably fitted to be regularly arranged in a three-dimensional lattice, the material will show mainly the properties of a rubber. If the forces are larger, and the fitting better, the properties of a plastic are exhibited; and if a distinct tendency for crystallization prevails, one obtains materials of a typical fiber character, it was stated.

Maurice L. Huggins, of Eastman Kodak Co., led the discussion of the papers that followed and explained how the space occupied by the solute fraction in polymer solutions influenced the viscosity of such solutions and showed how the Staudinger equation for the relation between molecular weight and viscosity should be used, depending upon whether the polymer had a rod shaped, slightly kinked, or very kinked chain molecule.

Joint Meeting at Niagara Falls

A JOINT meeting of the Buffalo Group, Division of Rubber Chemistry, and the Western New York Section, both of the A. C. S., was held in the Prospect House, Niagara Falls, N. Y., February 18. A cocktail party in honor of D. S. le Beau, the speaker, preceded the dinner and meeting and was attended by officers of the two A. C. S. groups. Present also was E. A. Hauser, of Massachusetts Institute of Technology.

Earl Booth, of the Larkin Co., gave an after-dinner talk on "Perfumes in Wartimes", during which he exhibited a large collection of rare and synthetic odors.

Dr. le Beau spoke principally of the importance to the nation's rubber supply and production, of guayule, reclaim, and synthetic rubber. Work being carried out at M.I.T. on the new methods of deresinification and compounding of commercially deresinified guayule in order to improve the properties of finished products made from this rubber was described in some detail. In discussing reclaim, the speaker mentioned that improvements in the reclaiming process were overdue, but when realized, much greater service life could be obtained from products using this material. Dr. le Beau deplored the lack of basic knowledge of the molecular structure of the synthetic rubbers, since the lack of such knowledge is a handicap in developing the best methods for the use of these rubbers in factory processing. The problem of reclaiming synthetic rubbers, under investigation at M.I.T. for the past three years, presented process requirements at the start that seemed almost impossible of solution: namely, (1) must be inexpensive; (2) must use present equipment; and (3) the process must successfully reclaim natural and synthetic rubber. Despite these difficulties an interesting process has been worked out.

A long discussion period followed the presentation of this paper.

Chicago Group Meeting

THE Chicago Group, Division of Rubber Chemistry, A. C. S., held its first meeting of 1943 on February 12 at the Morrison Hotel, Chicago, Ill. Arthur M. Neal, of E. I. du Pont de Nemours & Co., Inc., was the speaker, who presented a very informative paper on "The Use of Accelerators in Buna S."

Dr. Neal said that although to date the best results have been obtained with the various well-known types of accelerators used in natural rubber compounding, he would predict non-sulphur accelerators of GR-S as a promise of the near future. The acidic accelerators, such as MBT and 2MT, were considered as an important class, and the thiurams as rapid, safe, providing good tensile strength, good elongation, and tear resistance, with a flat curing curve for use with this synthetic rubber. The dithiocarbamates were also, as a rule, quite rapid accelerators. Basic accelerators, as guanidines and aldehyde-amines, were weak in their action with GR-S, but were good activators. Dr. Neal cautioned against taking these results as final since they represented work that had been done up to the present time, and some of which is now under further investigation. In conclusion, he also advised rubber technologists against relying too much upon their rubber experience in the formulation of GR-S compounds.

Dr. Neal's talk was followed by a colored motion picture, "This Plastic Age." The meeting was attended by 120 members of the Chicago Group and their guests. The next regular meeting will be held April 30, the place to be announced later.

Plastics before Akron Group

THE Akron Group, Division of Rubber Chemistry, A. C. S., with about 200 in attendance met January 22 at the Akron City Club to hear P. F. Robb, of Hercules Powder Co., Wilmington, Del., discuss

plastics. Hundreds of different plastic products were on display, and the colored sound movie, "Modern Plastics," also was shown, revealing manufacturing and molding procedures.

Entertainment was provided by "Dr." Witherspoon with his bag of medicines and tricks.

At the business meeting the following nominating committee was appointed: Ralph LaPorte, chairman; H. V. Powers, Clarence Moore, and L. V. Cooper.

Los Angeles Group Convenes

APPROXIMATELY 130 members and guests attended the February 2 meeting, at the Hotel Mayfair, Los Angeles, Calif., of the Los Angeles Group, Division of Rubber Chemistry, A. C. S. A. Th. Polyzoides, journalist and educator, discussed the war, with emphasis on the South Pacific. Also on the program was E. L. Perry, assistant director of the Department of Agriculture's Guayule Emergency Rubber Project, who showed colored motion pictures and revealed details of this development.

At the business section the various committee heads presented their annual reports. The "1943 Yearbook" of the Group also was distributed.

War bonds, purchased by the Group, were won by W. E. Alexander (Caram Mfg.), Howard Parkerson, Jr., (Farrel-Birmingham), and Paul Ritter (U. S. Rubber). B. E. Dougherty, of B. E. Dougherty Co., donated a sport jacket; the winner was U. J. Bain (L. H. Butcher).

New York Group Plans

THE feature of the program for the spring meeting of the New York Group, Division of Rubber Chemistry, A. C. S., to be held at the Building Trade Employers Assn. Clubrooms, 2 Park Ave., New York, N. Y., on March 19, will be a symposium on the general situation in the various divisions of the rubber industry, late developments in compounding and processing, and the major problems of the various divisions and how they are being met. Men of recognized standing in each of the divisions: proofing, insulated wire, sundries, tires, mechanical goods, etc., will talk and then lead discussions. The meeting will start at 4 p.m.

In the evening, at 6.30 p.m., the regular dinner will be held, after which a speaker of prominence will talk on topics of the times. Tickets for the dinner, at $2 each, may be had by writing the Group's secretary-treasurer, B. B. Wilson, c/o INDIA RUBBER WORLD, 386 Fourth Ave., New York, N. Y.

Boston Group, March 12

THE Boston Group, Division of Rubber Chemistry, A. C. S., holds its spring dinner meeting 6:30 P. M., March 12, at the University Club of Boston, Boston, Mass. The program will include a paper by I. E. Lightbown, of Stanco Distributors, Inc., titled "The Compounding and Processing of Butyl Rubber", and an account of the Dieppe raid by Commando Bruce Thomas.

Reservations for dinner should be made with Secretary-Treasurer Harry A. Atwater, c/o Hood Rubber Co., Watertown, Mass., before March 10.

California Group Meets

THE Northern California Rubber Group held its second dinner-meeting January 28 at the Women's City Club in Oakland. There was no formal speaker as the 53 members and guests who attended participated in an open discussion. Several papers were presented during the course of the evening, however, and Leonard Boller, research chemist for Pioneer Rubber Mills, Pittsburgh, Calif., presided. Representatives of the tire industry, mechanical goods industry, and Mare Island Navy Yard reported on their experiences with Buna S. As several questions concerning Buna S could not be answered by any one present, it was decided to put them before the Buna S experts at the next meeting.

The door prize, a contribution of the Monsanto Chemical Co. of San Francisco, was won by Gene Foubert, of Plant Rubber & Asbestos Works, San Francisco. Table favors consisting of plastic match box covers were donated by The San Francisco Sulphur Co.

The next meeting was scheduled for February 25 at the same place. The program included speeches by J. Crosby, of Thiokol Corp., on the latest developments in "Thiokol", and by C. A. Carlton, of J. M. Huber, Inc., on Buna S.

Detroit Group Appointments

THE executive committee of Detroit Rubber & Plastics Group, Inc., met February 5 at Book Cadillac Hotel, Detroit, Mich., to make arrangements in connection with the A. C. S. spring meeting scheduled for April 12-16 at Detroit. An entertainment committee was selected as follows: chairman, J. H. Norton (Auburn Rubber), J. R. Schroyer (R. T. Vanderbilt), and E. F. Riesing (Firestone).

To broaden the scope of the Wayne University project, the "Rubber and Plastics" course sponsored by the Detroit Group, the following members were nominated to the educational committee: chairman, W. M. Phillips (General Motors), W. G. Nelson (U. S. Rubber), Mr. Riesing, J. C. Dudley (Chrysler), W. E. Biggers (Rohm-Haas), and C. W. Selheimer (Wayne U.).

The following are the Group officers selected for 1943: chairman, W. B. Hoey (Bakelite); vice chairman, F. Wehmer (Minnesota Mining); secretary-treasurer, E. J. Kvet (Baldwin Rubber); program, Mr. Dudley; entertainment, Mr. Schroyer; counselor, J. H. Doering (Ford); publicity, J. W. Temple (U. S. Rubber); membership, A. J. Kearfott (General Motors); executive committee, Mr. Biggers and J. P. Wilson (Ford).

A. I. C. Hears Cramer

AT A meeting of the New York Chapter of the American Institute of Chemists at the Chemists' Club, New York, N. Y., on January 29, Howard I. Cramer, of Sharples Chemicals Corp. and secretary of the Division of Rubber Chemistry of the American Chemical Society, spoke on synthetic rubber. Reviewing the rubber situation, Dr. Cramer emphasized that our stockpile of natural rubber must not be consumed below 120,000 tons, and that the "stop-gap" expedients for increasing the supply of our natural rubber from South America and Africa and guayale rubber from Mexico and Southern United States, together with increased production of reclaimed rubber, would be inadequate to fill our needs. The properties, applications, and prices of the various synthetic rubbers were then compared with natural rubber. Figures were given to show the normal consumption of natural rubber in industrial products in peacetime as compared with the requirements for various military items during the war.

Reference was made to the delay in synthetic rubber production at present, and it was stated that it would be a miracle if the entire program be completed by the end of 1943 as originally scheduled. If the war lasts two or three years, we will have a well established synthetic rubber industry, and after the war the price competition between natural and synthetic rubbers will be keen, the speaker said. New uses for rubber will probably have to be found after the war to consume the production of both natural and synthetic rubbers that will be available, but never again will we have to pay cartel prices on natural rubber, as we have been paying since the year 1922.

Rubber Products Specifications

EMERGENCY alternate provisions in two specifications covering Friction Tape for General Use for Electrical Purposes (D 69-38) and Rubber Insulating Tape (D 119-38) have been developed by the A. S. T. M. Committee on Rubber Products to aid in procurement and in order to be in line with orders issued by the WPB.

In the specification for insulated wire and cable, D 469, the emergency provisions are intended primarily to conserve rubber and provide an agreed-on specification for insulation which may be operated at copper temperatures above 60° C. The requirements are acceptable to a number of organizations whose inspection or activities involve a use of the material; and since no other standard has been available, the new provisions will serve an important need and can be referred to in restrictive orders of the WPB and can be made available to commercial organizations and Underwriters Laboratories.

Copies of emergency alternate provisions and the specifications can be obtained from headquarters of the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa., at 25¢ each.

Report on Agripol at Ontario Group Meeting

THE Ontario Rubber Group, Canadian Chemical Association, held its third meeting of the season at Toronto on January 27. The meeting, presided over by Chairman J. C. Howard, was held in the Chemistry Building, University of Toronto. The customary dinner at Hart House preceded the meeting.

The speaker of the evening, C. A. Braidwood, of Reichhold Chemicals, described the development, properties, and uses of Agripol synthetic rubber, which is now in commercial production. This rubber-like polymer, a reaction product of polyhydric alcohols with polymerized vegetable oil acids or their derivatives, is a dark brown, viscous, resinous mass that has mixed with it during the course of polymerization, channel black and other fillers, after which mixing it can be handled on regular rubber mills or in the Banbury, it was said. The molecular weight of Agripol is controlled by regulating the degree of polymerization. It may be compounded in the same manner as natural rubber with known rubber chemicals, and Agripol stocks were reported as having very good tack. Considerable data were presented showing the results of investigations on the use of various fillers with this rubber. Because of the character of this chemurgic rubber, its biggest single use is in gaskets for food closures, and also tubing of varied types, proofed goods, mechanical goods (non-dynamic), cements, and water dispersions. Of considerable importance is the fact that Agripol is compatible with "Thiokol", Hycar, neoprene, Buna S, reclaim and natural rubber to all degrees. Further investigations of the material as an extender, processing agent, and tackifier for these rubbers are being made, it was stated.

The next meeting of the Group is tentatively arranged for March 10, when W. D. Parrish, of the Hycar Chemical Co., will speak. The combined meeting with the Buffalo Group, originally scheduled for April 30 at Niagara Falls, has been cancelled. As the A. C. S. Spring Meeting has been changed to Detroit, an attempt is being made to hold the "International" meeting there.

Adhesives Discussed at Montreal

W. GALLEY, chief, Colloid & Plastic Section, National Research Council, addressed the February 12 meeting of the Rubber & Plastics Division, Society of Chemical Industry, Montreal Section. His talk on "Modern Developments in Adhesives, Coatings, and Laminates" was well illustrated by slides, and many interesting points were revealed including the fact that laminates are now being made with physical properties equal to any known metal alloys on a weight basis.

The next session of the Division is scheduled for the Ritz Carlton Hotel on March 12, when, after dinner, J. D. Benedito, of Canadian Resins & Chemicals, Ltd., will discuss "Vinyl Resins."

"Vinyl Polymer" Reprints To Be Available

Because of numerous inquiries, it is planned to prepare reprints of the series, "German Patents Relating to Vinyl Polymers," which has appeared in INDIA RUBBER WORLD during the past year or more. These reprints may be obtained at a nominal cost if a request indicating the number of copies desired is made before May 1, 1943.

Conference on Rubber Elasticity

A RESEARCH conference on "The Present State of the Kinetic Theory of Rubber Elasticity", sponsored jointly by the Polytechnic Institute of Brooklyn and the Society of Rheology, will be held at Brooklyn Polytechnic, 99 Livingstone St., Brooklyn, N. Y., April 3, starting at 10:30 a.m. M. L. Huggins, Eastman Kodak Co. Research Laboratory, Rochester, N. Y., and L. A. Wood, National Bureau of Standards, Washington, D. C., are scheduled to speak, and special invitations to share in the discussion have been extended to outstanding contributors to the subject. Members of the rubber and allied industries are invited to attend.

Correction

IN THE article on "Carbon Black in All-Reclaim Tire Treads", which appeared on page 469 of our February issue, in Table 3 under Soft Channel Blacks, the first black should be AA, not A, and the extrusion time should be 13.9 instead of 15.0 seconds. Also, in the paragraph immediately preceding the above table the first black referred to should be Continental AA, not Continental A.

Help Wanted

United States Civil Service Commission, Washington, D. C., has announced that positions are open to persons with a practical knowledge of rubber and oil-producing crops and other tropical plants, including the procurement of wild rubber. Salaries range from the assistant grade at $2,600 a year to the chief crop production specialist, at $8,000. Some openings are in continental United States, but the majority are mainly in South and Central America. For some positions, major students in agronomy, horticulture, plant breeding, forestry, or other courses related to plant production are desired in addition to the required experience. Knowledge of French, Spanish, or Portuguese is helpful. Applications will be accepted until the needs have been met. Qualified persons are urged to apply immediately. There are no age limits or written examinations. Blank forms and further information may be obtained at first- and second-class post offices, from civil service regional offices, and from the U. S. Civil Service Commission at Washington.

Seatest Rub Sub Cement and Synthetic Seatex

A NEW cement that contains neither crude nor reclaimed rubber, but is claimed to be very similar to solvent-type rubber cements has been announced. Seatest Rub Sub Cement is reported as suitable for use in shoe manufacture and allied leather industries. It is quick drying and may be varied to meet individual requirements. Synthetic Seatex is a substitute for latex with a higher solids content than the Rub Sub Cement and is also suitable for shoe manufacturing operations such as folding and combining. This Seatex is miscible with latex and in reasonable proportions does not materially reduce the tensile strength of the film; while at the same time it tends to improve the aging qualities of the latex compound. Seaboard Seatex Corp., 611 Broadway, New York, N. Y.

Ambidex S

THIS activating plasticizer, Ambidex S, represents a further development of the Ambidex announced a short while ago and has been prepared especially for GR-S compounds. The Ambidex originally introduced will be known as Ambidex Regular, and the new grade as Ambidex S.

The new product will greatly assist in the processing of GR-S stock, particularly from the plasticizing standpoint. It also greatly assists incorporation and wetting of pigments. Ambidex S will perform in GR-S in the same way that Ambidex Regular works in natural rubber; that is, the use of small percentages will allow reduction of fatty acid and accelerator percentages. However high percentages, from five to ten parts, may be used where it is desired to combine the maximum plasticizing and tackifying effect, and such higher proportions may be used without danger of overcuring. Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

New Booklet on Accelerators

IN ORDER to aid in the many new problems of compounding being presented every day to the rubber chemist, the Educational Committee of the Office of the Rubber Director has compiled a booklet with the title of "Organic Accelerators of the Vulcanization of Rubber." The accelerators are listed according to chemical types, and the names of the suppliers of each separate type are also furnished. All organic accelerators that are now on the market which have been found of value in compounding Government Synthetic Rubber, either as primary accelerators, secondary accelerators, or vulcanization agents in stocks not containing added sulphur are included. Copies of the booklet are available to chemists, compounders, etc., on request, using company letterheads only. Address: Educational Committee, Office of the Rubber Director, War Production Board, New Municipal Building, 4th St. and Indiana Ave., N.W., Washington, D. C.

UNITED STATES

Rubber Program Developments

A stockpile of 54,000,000 gallons of ethyl alcohol, of which 15,000,000 gallons are at the various plants for making butadiene, is on hand in this country, according to W. G. Whitman, Chemical Division of the War Production Board, in testifying before the Gillette sub-committee early in January. Alcohol production during 1943 is estimated at 490,000,000 gallons, of which 200,000,000 gallons are to be used for butadiene production, and 570,000,000 gallons in 1944; when 300,000,000 gallons may be used for butadiene. Three new plants for the production of a total of 40,000,000 gallons of alcohol annually, to be located in Nebraska, Iowa, and Kansas, have recently been contracted for in partial fulfillment of the Baruch Committee recommendations that additional alcohol capacity totaling 100,000,000 gallons a year be provided.

Appearing before the same sub-committee, Bruce K. Brown, Assistant Deputy Petroleum Administrator, gave some interesting information on the progress of refinery conversions for butadiene production; additional facilities for 100,000 tons a year of butadiene had also been recommended in the Baruch Report. Location, cost, and other information for plants to produce 156,860 tons of butadiene a year were given. It was stated that of the 4,000,000 barrels a day of petroleum being refined, only about 65,000 barrels a day would be consumed for butadiene production both in the regular and refinery conversion plants. Cancellation of plans for refinery conversion units has reduced this program to a contemplated production of 96,760 tons a year of butadiene, according to Progress Report No. 2 of the Rubber Director (see page 576, this issue).

In addition to his decision to order 55% of the rubber program put under urgency ratings, (reduced to 43.6% by Economic Stabilizer James F. Byrnes), Donald M. Nelson revealed the status of pilot plants as of January 5, 1943, which are being investigated to determine which of certain new methods for the production of butadiene should be used in the special 30,000-ton Buna S plant recommended in the Baruch Report. The Celanese plant to produce butadiene from alcohol through the acetaldehyde, aldol, 1,3 butylene glycol route should be completed by March 1, it was indicated. A completion date on the Publicker project, which produces butadiene by the direct catalytic reduction of alcohol, was not given, but it was said that difficulties in obtaining the necessary high priorities for equipment had been cleared up, and the pilot plant should now be completed within a reasonable time. The Seagram project, which produces butadiene by the fermentation of grain to produce 2,3 butylene glycol, should have its pilot plant in operation by April 1 at the latest, it was stated.

In the course of the hearings of this sub-committee during January, Senator Gillette stated that he had been requested by representatives of government agencies and heads of agencies who are concerned with the war production program and war needs, to open active development of the whole synthetic rubber picture because the present situation is more acute than had been anticipated when his committee suspended hearings last summer. A resolution was passed that the committee visit various plants being constructed for the government for the manufacture of synthetic rubber. The committee has now suspended hearings on the rubber situation, however, pending the introduction of additional legislation, according to Senator Gillette. To date no new legislation by this committee has been introduced however.

Allen Heads New Rubber Procurement Organization

Jesse Jones, Secretary of Commerce, on February 22 announced the establishment of Rubber Development Corp., a subsidiary of the RFC, to take over the government's program for development and procurement of natural rubber, principally in Latin America. Mr. Jones made public a letter to W. M. Jeffers, Rubber Director, announcing the formation of the new corporation, its officials and purposes. The letter follows:

February 17, 1943.

Dear Mr. Jeffers:

Agreeable to your suggestion, Rubber Development Corp., a subsidiary of the RFC, will take over and assume the problem of developing and acquiring natural rubber and related products from foreign sources, thus separating the crude rubber program from the synthetic, which will continue to be handled by Rubber Reserve Co.

Rubber Development Corp. will be under the management of Douglas H. Allen, president, with Messrs. J. W. Bicknell and Reed Chambers as vice presidents and Mr. W. L. Clayton as chairman of the board.

As you probably know, Mr. Allen has had broad commercial operating experience in the tropics, and has already rendered very valuable service in arriving at a satisfactory understanding with the various countries involved, and laying the foundation for actual operations which are now beginning.

In addition to the officers mentioned, the board of directors include Mr. T. Ross Cissel of the State Department and Mr. H. Clay Johnson, RFC Counsel.

You may be assured of the faithful and energetic efforts of Rubber Development Corp. to get wild rubber as rapidly as possible. Any suggestions from you at any time will be appreciated.

Sincerely yours,
JESSE H. JONES,
Secretary of Commerce.

Honorable W. M. Jeffers
Rubber Director
War Production Board
Washington, D. C.

Office of the Rubber Director

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Frank R. Creedon
Ass't. Deputy Rubber Director in Charge of Plant Construction
Room 4149, RE 7500, Ext. 2513.

E. B. Babcock
Ass't. Deputy Rubber Director in Charge of Technology & Specifications
Room 4027, RE 7500, Ext. 74465.

R. P. Dinsmore
Ass't. Deputy Rubber Director in Charge of Research and Development of Synthetic Rubber
Room 4016, RE 7500, Ext. 6491.

E. R. Gilliland
Ass't. Deputy Rubber Director in Charge of Raw Materials for Synthetics
Room 5004, RE 7500, Ext. 3637.

Grafton B. Perkins
Special Ass't. to Rubber Director
Room 5001, RE 7500, Ext. 75639.

Frank P. Downey, Jr.
Administrative Officer
Room 5053, RE 7500, Ext. 71193.

Darrell O. Churchill
Special Ass't. to Rubber Director
Room 5014, RE 7500, Ext. 3256.

Note: The above list gives the names, positions, room numbers, telephone and extension numbers of the top executives in the Office of the Rubber Director, which is located in the New Municipal Bldg., 4th St. and Indiana Ave., N.W., Washington, D. C., as they exist at the present time (February 23).

CALENDAR

Mar. 5.	S. C. I.—A. C. S. William H. Nichols Medal Award.
Mar. 10.	Ontario Rubber Group, C. C. A. University of Toronto.
Mar. 12	Boston Rubber Group. University Club, Boston, Mass.
Mar. 12.	Rubber & Plastics Division, Montreal Section, S. C. I. Ritz Carlton Hotel, Montreal, P. Q. Canada.
Mar. 16-17.	National Association of Waste Material Dealers, Inc. Annual Conference. Hotel Sherman, Chicago, Ill.
Mar. 19.	New York Rubber Group. Building Trade Employers Assn. Clubrooms, 2 Park Ave., New York.
Apr. 3.	Conference on Rubber Elasticity. Polytechnic Institute of Brooklyn, N. Y.
Apr. 9.	Rubber & Plastics Division, Montreal Section, S. C. I. McGill University.
Apr. 12-13.	Industrial Accident Prevention Assns. Annual Convention. Royal York Hotel, Toronto, Ont., Canada.
Apr. 15-16.	Rubber Division, A. C. S. Spring Meeting. Book-Cadillac Hotel, Detroit, Mich.
Apr. 30.	Chicago Rubber Group.

OPA Changes

RPS 63 as Amended February 13, 1943—Retail Prices for New Rubber Tires and Tubes—adds brands of 47 distributers of new passenger-car and truck tires and tubes to lists of brands covered by specific maximum retail prices for base sizes. Three other changes, included in the action, which is in Amendment 7 to the schedule, became effective February 19. Eliminated is the requirement that retailers report to local rationing boards maximum prices for new tires and tubes, as prices for all retailers of a given brand must be the same. It is, moreover, no longer required that certain items be set forth separately in lists of maximum prices that dealers must post on their premises. In the formula for computing prices in relation to those for specified base sizes, specific provision is made as to the size the distributer should use for reference when he hasn't a brand of the usual base size.

Amendment 8, MPR 107—Used Tires and Tubes—effective February 8, authorizes sellers of factory rebuilt used tubes for passenger-car and truck tires to add the federal excise tax to the maximum price. Previously the rebuilding of used tubes had been prohibited by the WPB, but now factories may rebuild tubes upon application to the Rubber Director. The reprocessed tubes must be marked "Factory Rebuilt", which "means a used tube in which at least one damaged portion has been replaced by splicing and vulcanizing into the tube a sound portion of another tube or which has been cut down to a smaller size by splicing and vulcanizing together sound portions of the tube." The amendment was put out in order to cooperate with the Office of the Rubber Director to encourage fullest possible use of available rubber products.

Amendment 9, effective February 24, provides that OPA minimum quality specifications for used tires and tubes need not apply to tires and tubes repaired in accordance with written permission of the Office of the Rubber Director. This action is in further cooperation with an experimental program sponsored by the Rubber Director for reclaiming more used automotive tires and tubes. Retail purchasers of these tires and tubes must be given the written statement: "Experimental tire (or tube). Keep this slip to identify the tire (or tube)." All necessary information identifying the purchase must appear on the slip.

Amendment 6, MPR149—Mechanical Rubber Goods—issued January 28 and effective February 3, eliminates the report required of manufacturers covering their maximum and selling prices for goods, except standard list articles, whose maximum prices are determined by use of a cost formula; requires deduction from maximum prices of charges for the federal excise tax repealed November 1, 1942; simplifies expression of provisions relating to federal and state taxes in relation to maximum prices without changing their effect; and adds a definition of synthetic rubber, as follows:

". . . a material obtained by chemical synthesis, possessing the approximate physical properties of natural rubber, when compared in either the vulcanized or unvulcanized condition, which can be vulcanized with sulphur or other chemicals with the application of heat, and which, when vulcanized, is capable of rapid elastic recovery after being stretched to at least twice its length at temperatures ranging from 0° F. to 150° F. at any humidity."

Rubber heel makers are excused from reporting their unit costs to the OPA in Amendment 5 to MPR 200—Rubber Heels, Rubber Heels Attached and Attaching of Rubber Heels—effective February 6. Since manufacturers use different cost bases, the necessary information can best be obtained by cost studies made at the plants by OPA accountants. MPR 200, as Amended February 1, 1943, now incorporates amendments 1-5.

Amendment 9 (February 10) to Ration Order 6—Men's Rubber Boots and Rubber Work Shoes; Rationing Regulations—permits retailers and distributers to: exercise greater choice as to the type of rationed footwear they may buy in replenishing inventories; increase inventories when not large enough to meet customers' needs; get stocks required to fill orders of certain government agencies permitted by the regulations to purchase rationed footwear without turning over rationing certificates to the sellers; open new sales outlets.

Amendment 3, MPR 220—Certain Rubber Commodities—effective February 8, embodies several changes to the regulation including: deduct federal excise tax (repealed November 1) charges from maximum prices for rubber fabrics, apparel, and other commodities containing rubber; excuse manufacturers from making reports on maximum prices for orders under $25 which involve price changes due only to shortages of materials or parts, or determined on the basis of direct costs, wage rates, and gross margins; allow 45 to 75 days, instead of 60, in which a manufacturer who begins production of a commodity as a standard list item may adjust its maximum price, in order to give the manufacturer time to obtain sufficient cost data in recomputing his price; state specifically that maximum prices be determined for each class of purchaser of each rubber commodity that differs from one delivered or offered in March, 1942, only because of changes caused by shortages of materials or parts; permit manufacturers to change discounts in accordance with changes produced in prices by the preceding provision; establish for the first time that no manufacturer charge a larger proportion of transportation costs incurred in the delivery of rubber commodities than he charged purchasers of the same class for the same or similar commodities during March, 1942; amplify information in reports to OPA on prices that must be authorized specifically by OPA, such as proposed pricing method and price obtained thereby and a statement justifying the method.

MPR 300 — Maximum Manufacturers' Prices for Rubber Drug Sundries — and MPR 301—Retail and Wholesale Prices for Rubber Drug Sundries—both underwent changes last month. Amendment 1 (February 1) to each order names the following articles which were not intended to be classed as rubber drug sundries and therefore are not subject to the regulations: adhesive tape, medicated footpads and plasters, sanitary belts, supporters (men's athletic), surgical elastic bandages and supports, surgical stockings, surgical tape, suspensories, and trusses. Amendment 1 to MPR 301 also states that three types of baby feeding nipples (breast, semi-breast, and valve types) may be priced at retail higher than the limit established in the regulation. Amendment 2 to both orders, also effective February 1, advanced the effective date of the regulations from February 1 to March 1 as applied to sales and deliveries of baby bibs, baby pants, crib sheets, diapers, diaper bags and covers, hospital blankets, mattress covers, pillow cases, and play pads in order to permit investigation of claims of hardship brought by manufacturers of such merchandise on the basis of steep material cost rises since December 1, 1941, the base date of the regulations.

A correction to MPR 300 changes the prices listed in Table I, Appendix B, for hot water bottles," "Consumer grade—colored—(molded)" to .57 and for "Consumer grade—black—(molded)" to .43.

Order 1 under 1315.51 (f) of RPS 56, effective February 16, sets maximum prices which Boston Woven Hose & Rubber Co., Boston, Mass., may charge for No. 611 Special reclaimed rubber.

Tire Rationing Rules Expanded

Several amendments have been added to Ration Order 1A—Tires, Tubes, Recapping and Camelback. Under No. 7, effective February 8, dealers whose business was interrupted by tire rationing and who wish to reenter the tire and tube trade and others who want to enter this field may secure limited stocks of tires and tubes. Another factor in the action, which will make possible the setting up of dealerships in areas that may not be adequately served, is the importance of enough tire inspection stations to administer the government's tire conservation program. Therefore all who enter the tire business must not only be experienced in selling and servicing tires, or have an employe who is, plus suitable place of business and necessary equipment, but must also be willing to act as OPA tire inspectors. The amendment also provides that recappers shall get allotments of camelback from the state or district office instead of local boards as formerly.

Amendment 8, also effective February 8, permits switching of tires among passenger cars operated by a federal, state, or local or foreign government agency. In consequence police and other government owned cars which do not have spares assigned to them specifically may draw tires from a common pool when necessary. Also, tires may be mounted on any automobile for testing purposes where the use of the tires for that purpose has previously received governmental approval. In such cases the local board which issued the Tire Inspection Record for the vehicle must be notified within a week.

The next amendment, effective February 9, provides that an estimated 4,200 interstate bus and truck operators need no long-

er await final decision by the ICC on their applications for certificates of public convenience and necessity in order to obtain emergency reserves of tires. If they show they have applied for the certificates and that the ICC has authorized them to operate pending final decision on their applications, the OPA will authorize their obtaining the tires provided they meet other conditions, which remain the same as formerly. Moreover now vehicle operators and not the owners must make the required statements.

Amendment 10, effective February 15, takes care of several situations that have arisen during the first two months of the Mileage Rationing Plan. Thus, tire eligibility is provided for certain commercial vehicles disqualified by a technicality when the ODT excluded them from its regulatory control, including non-gasoline vehicles and unregistered passenger cars, commercial vehicles not supervised by the ODT, rental cars, buses for clinics, house trailers, and spares for farm, industrial, and non-highway vehicles. The amendment also provides that the local rationing boards may issue certificates for the purchase of 4.00x12 implement-type tires, which are in ample supply, for passenger automobiles eligible for replacements; prescribes the conditions under which so-called "loaner" tires may be mounted and used on automobiles for short periods; and makes certain vehicles eligible for "mud and snow" tires besides their ordinary ones.

The eleventh amendment, effective February 15, indicates that tire dealers whose stocks of tires, tubes, or recapping material are inadequate to meet customers' needs may, under specified conditions, buy to fill these requirements from others wishing to reduce inventories. Also outlined is the procedure whereby a dealer may replace lost, stolen, or destroyed tires, tubes, and camelback, or replenishment portions of rationing certificates. Besides any person, upon written authorization of the WPB, may transfer tires or tubes to an equipment or vehicle manufacturer for use as original equipment.

Amendment 12, effective February 20, eliminates need of a rationing certificate when passenger-car and light-truck tires are recapped with reclaimed rubber. This plan, which has the approval of Rubber Director Jeffers, is designed to save rubber by extending the life of tires already in use. It will thus reduce the demand for replacement tires.

The thirteenth amendment reads that after March 1 tires of reclaimed rubber will be available only to motorists with a monthly mileage ration of more than 560 miles; other car owners may obtain only used and recapped tires. The war tire, moreover, has been transferred from Grade III to Grade II because of the decreasing supply of other casings in that group, which includes new tires with a maximum price of less than 85% of the ceiling price for standard quality tires, factory "seconds", and tires that have run less than 1,000 miles.

Supplementary Directive 1Q, as Amended February 15, 1943—Rationing of Tires, Tire Casings, Tire Tubes, Etc.—defines gasoline as "any petroleum product either commonly known or sold as gasoline . . . , except (i) fuel oil as defined in Ration Order No. 11, naphthas, aromatics, synthetic rubber raw materials, solvents or specialties . . . , (ii) any finished petroleum product having an octane rating of 85 or more . . . , and (iii) liquefied petroleum gases."

The tire inspection program during its first two months "rescued" an estimated 400,000 passenger car casings so worn or damaged that they needed immediate repair to save them for further use, OPA reported. The estimate is based on a sample survey of the experience of inspectors so far under the periodic tire inspection program, set up by OPA to make sure that tires give their utmost in mileage and to preserve them for recapping when that becomes necessary.

Additional Orders

Order 253 under 1499.3 (b) of GMPR, effective February 1, gives procedure to determine maximum prices to be charged by Remington Products Co., Akron, O., for heel, arch, and metatarsal pads and bottom filler pads as a consequence of the substitution of "Remtex" for rubber in their manufacture.

MPR 316, effective February 12 for Continental United States and March 29 for territories and possessions, covers maximum prices for coated and bonded abrasive products.

Amendment 1 to Order 1 under Supplementary Order 9, issued January 30 and retroactive to January 2, authorizes the maximum prices which National Carbon Co., Inc., New York, N. Y., may charge the United States Navy for certain radio batteries. Amendment 2, effective February 24, lists additional such prices.

Ration Order 17, effective February 7, covers the rationing of footwear. "Shoes means any footwear made in whole or in part of leather or with rubber soles, except: hard-soled boudoir or house slippers; soft-soled slippers; soft-soled infant shoes; soft-soled moccasins; or waterproof or snow and water repellent rubber boots or rubber work shoes, stocking-foot waders, arctics, gaiters, overshoes, galoshes, work rubbers, lumberman's overs, dress rubbers, or footholds." Waterproof rubber footwear is excluded because the types of which the supply is most critical are already rationed under Ration Order No. 6. Supplementary Directive 1-T, issued February 8 by the WPB, delegates authority to the Office of Price Administration with reference to the rationing of shoes.

Amendment 2 to RO 17, effective February 25, eliminates from rationing regulation certain "play" shoes and others not ordinarily worn on the street, including rubber-soled shoes with fabric uppers and bathing slippers.

The War Department, Washington, D. C., recently announced that the Army's rubber conservation program has reduced the use of crude rubber in war materiel by 45%, on the basis of the amount of rubber in the same materiel as of December 7, 1941. There are 11 general principles designed to reduce or conserve the amount of rubber contained in items of war materiel composed in whole or in part of that substance. In many instances, rubber is entirely eliminated. The 11 principles cover: designs, constructions and compounds; factory inspection of finished products; packaging; procurement; storage; issue; application; preventive maintenance; reconditioning; reclaiming and coordination.

The Office of Defense Transportation, Washington, D. C., on January 25 asked bus and taxicab operators to prepare immediately plans for curtailment of mileage should gasoline or rubber shortages require emergency mileage curtailment on short notice. The order affects only operators of a fleet of 10 or more rubber borne vehicles, who were asked to submit three plans: (1) to eliminate 10% of all presently operated rubber borne vehicle miles; (2) to eliminate 20%; and (3) to eliminate 30% of such mileage.

The ODT has announced that beginning March 1 motor carriers making emergency deliveries for the Army, Navy, U. S. Maritime Commission, and the War Shipping Administration may operate their trucks in excess of 35 miles an hour if the vehicles carry certificates of exemption and display pennants indicating emergency service. This action, adopted to speed emergency delivery of war supplies, has the approval of the Office of the Rubber Director for a 60-day trial period.

To safeguard continued operation of existing automotive equipment despite serious shortages of materials and manpower, the ODT is sponsoring establishment of maintenance advisory committees throughout the country. One of their duties will be to assist automotive, tire, parts, and oil companies cooperating with the U. S. Truck Conservation Corps in promoting greater interest in preventive maintenance among vehicle owners, drivers, and mechanics. At the same time each ODT district office designated a staff member as "maintenance specialist." Among his duties is cooperation with local OPA officials in securing tires for trucks, buses, and other essential vehicles.

E. G. Holt, formerly specialist on rubber for the United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., is now in charge of the Commercial Research Section of the Rubber Reserve Co. This new section has the job of promoting within the Rubber Reserve Wild Rubber Division the circulation of material helpful to program objectives and to handle the statistical and research matters relating to the program, including reports on such matters to the Office of the Rubber Director.

Harold Smith, Budget Director, has ordered non-military federal agencies to make available to the Treasury Procurement Division all tires in excess of the standard allowance established by OPA for the public. About 100,000 tires will be pooled as a result of this order.

WPB Activities

Supplementary Order M-15-g—Rubber Tires for Industrial Power Trucks—as Amended February 17, 1943, permits the use of Preference Rating Certificate PD-408 to acquire such tires. Other changes made in the order follow. Replacement tires for such trucks may not be delivered on a metal base band unless a similar band is turned over to the deliverer, or unless the base band is furnished by the tire purchaser. Usable metal base bands for affixing tires must not be destroyed. Each application for a preference rating on either PD-408 or PD-1A forms for a replacement tire must be accompanied by a certification that the tire is needed for replacement within 15 days of the specified delivery date. Persons engaged in furnishing tires for industrial power trucks may have inventories not in excess of 30-day needs, under certain restrictions.

Production, sales, and use of elastic fabric, rubber yarn, and elastic thread were put under complete allocation control February 17 by the Director General for Operations in amending Orders M-174 (Elastic Fabrics) and M-124 (Rubber Yarn and Elastic Thread). In consequence elastic fabric or rubber yarn can no longer be produced for or sold to the armed services, certain other government agencies, or to any other purchaser without specific authorization of the Director General for Operations. The sole exceptions are sales by or to the Defense Supplies Corp. The orders cover all types of rubber yarns (including synthetics) and elastic fabrics six inches wide and less, found suitable for use by the armed forces and essential civilian and industrial safety uses. Rubber yarn and thread in a retail merchant's stocks on or before March 29, 1942, and elastic fabric which on June 20, 1942, had been packaged in the customary retail form are exempt from the orders.

CMP News

Controlled Materials Plan Regulation 5—Maintenance, Repair and Operating Supplies—was issued February 9 to provide a uniform procedure for obtaining maintenance, repair and operating supplies, both in the case of controlled materials obtained by the use of allotment symbols under the CMP and in the case of materials or products obtained by preference ratings. High preference ratings are assigned to many operations including the manufacture of coal-tar and coal-tar derivatives; dyes, colors, and pigments; organic and inorganic chemicals; plastics and synthetic resins; solvents; varnishes; chemical manufacturing machinery and equipment; conveying machinery and equipment; plastic working machinery; rubber working machinery; insulated wire and cable; storage batteries; abrasive wheels, stones, papers, and cloths; rubber and rubber products (natural and synthetic); safety equipment, including helmets, goggles, and civilian defense items; tires and tubes; fire hose and related equipment; plumbers' specialties; and to persons engaged in several industries including analytical, research, testing, and control laboratories; discovery, production, transportation, refining, and marketing of natural gas, petroleum, and petroleum products. Included as "operating supplies" are, when specially designed and used to furnish protection against specific occupational hazards (other than weather), safety clothing impregnated or coated to make them resistant against fire, acids, other chemicals or abrasives; safety industrial rubber gloves and hoods and linemen's rubber gloves and sleeves; plastic and fiber safety helmets.

The Requirements Committee on February 2 allotted to the 14 Claimant Agencies, including the Office of Rubber Director, the amounts of steel, copper, and aluminum to be delivered to manufacturers for America's war production during the second quarter of 1943 under the CMP. WPB Chairman Nelson stated:

"Full provision has been made in the allotments for the 'must' programs—synthetic rubber, high-octane gasoline, aviation, army material, merchant and naval shipping and escort vessels—as they currently stand. Less essential programs have been cut to the bone."

Critical Materials

Superseding all previous "critical lists," WPB last month released the seventh issue of the Material Substitutions and Supply list, the official roster of critical and substitute materials used in the war program and for essential civilian use. Zinc, chromium, methyl methacrylate (lucite), benzol and derivatives, methyl alcohol, birch and douglas plywood are among the materials that have become more critical in supply since November 2, when the previous list was issued. Current supplies of more than 200 basic materials (listed in Group I) are insufficient for war and essential civilian demands, and in a number of cases for war demands alone. Group II lists materials essential to the war program, the supplies of which are at present in approximate balance with war and essential civilian demands. Group III lists noncritical materials, the supplies of which are ample enough to make them available as substitutes for critical materials unless the availability of these substitute materials is restricted locally by labor, manufacturing, or transportation difficulties.

The Plastics & Synthetic Rubber Section, Chemicals Division, WPB, on February 8 requested the industry to furnish detailed figures on the production and distribution of casein as such information is necessary because of recent reductions in the potential supply of milk available for casein in 1942 and the continued shortage of shipping space from South America.

The Oxygen and Acetylene Industry Advisory Committee recently was told at a meeting in Washington that shortages of both oxygen and calcium carbide are anticipated during the early part of 1943. These commodities are vital to the production of synthetic rubber, many war chemicals, ships, planes, tanks, and other implements of war.

The WPB last month stated that as sponges—animal, vegetable, and synthetic—are required by the armed forces and industry in such great quantity, comparatively few will be available for household use for the duration.

Executive Changes

Chairman Nelson has appointed Charles E. Wilson executive vice chairman of the WPB, and Ferdinand E. Eberstadt, program vice chairman, has resigned. Mr. Wilson assumes authority over all phases of WPB programs (including rubber), and activities, including control of industry divisions and operations of the CMP, and also takes over Mr. Eberstadt's duties.

William M. Batt, WPB vice chairman, on February 16 announced membership of the Combined Rubber Committee, appointed by the Combined Raw Materials Board to study demands of the United Nations for crude and synthetic rubber, as follows: L. D. Tompkins, WPB Office of Rubber Director (chairman); Stanley Osborne, Office of Rubber Director; Enid Baird, Combined Raw Materials Board; P. M. Benton, Combined Raw Materials Board; and B. J. O'Donnell, British Raw Materials Mission.

B. C. Heacock has been made Deputy Director General for Distribution, succeeding J. A. Krug, now Power Director. Mr. Heacock was formerly director of the Priorities Control Division.

F. Higginson Cabot, director of the Commodities Bureau, was appointed Assistant Deputy Director General for Industry Divisions. Hugh Hughes, Deputy Director of the Commodities Bureau, becomes director.

Howard Young, president, American Zinc, Lead & Smelting Co., St. Louis, Mo., was appointed director of the new Mineral Resources Coordinating Division and chairman of two related committees: Mineral Resources Operating Committee and Minerals & Metals Advisory Committee.

Other Orders

Allocation Order M-25 (General Preference Order M-25) was amended February 20 to cover formaldehyde, hexamethylenetetramine, and pentaerythritol.

Requests for allocation of capryl alcohol must be made in the future on the standard forms PD-600 and PD-601, the WPB indicated in Allocation Order M-167, as Amended February 6, 1943. Capryl alcohol is used in making certain synthetic rubber and coating materials and as an ingredient in lubricating oils.

Standard forms PD-600 and PD-601 must be used in the future in requesting allocations of phthalate plasticizers, the WPB ruled February 6 through the issuance of Allocation Order M-203, as Amended. Phthalate plasticizers are used in the manufacture of plastics, synthetic rubber, lacquers, and smokeless powders.

Conservation Order M-103 was amended January 30, 1943, to include as dyestuffs and organic pigments those "synthesized or produced in whole or in part from benzene, aniline, toluene, phthalic anhydride, phenols, cresols, xylonols, or derivatives of any of the foregoing."

Conservation Order M-217—Footwear—was amended February 13 in a further move to save leather, rubber, steel, and other materials. Unessential frills on foot-

wear are eliminated; heel heights limited; several types of shoes discontinued; and only four colors permitted. One new restriction reads that "no person shall put into process any upper leather or leather or rubber soles for the manufacture of men's sandals."

General Preference Order M-287, effective March 15, places under restriction anhydrous aluminum chloride to assure supplies to meet the needs of production of war materials, as synthetic rubber, aviation gasoline, nylon, and toluene.

General Transportation Order T-1—Controlled Shipments—issued January 30, relates to such products as: acetone, butyl acetate, ethyl acetate, caustic soda, ethyl alcohol, acetaldehyde, acetic acid, acetic anhydride, acrylonitrile, butadiene, butanes, carbon tetrachloride, coal tar pitch, dimethylaniline, diphenylamide, ethylene dichloride, fatty acid, formaldehyde, formic acid, furfural, hydrochloric acid, peroxide, latex, naphtha, naphthalene, palm oil, chlorinated paraffin wax, phenol, pine tar pitch, plasticizers, rapeseed oil, synthetic resins, rosin oil, rubber solvent, sodium bisulphite, styrene, pine tar, toluol, trichloroethylene, tricresyl phosphate, vinyl acetate, xylol.

Limitation Order L-114—Safety Equipment—was amended February 15. Changes include redefining of safety equipment and hazard measuring devices; placing the order under priority regulations; rewriting paragraphs on violations, appeals, and communications; and adding to the list of scarce materials not to be used for safety equipment, except under certain conditions, elastic fabric as defined in Conservation Order M-174. Reference is also made in Appendix A to permitted uses of crude, synthetic, reclaimed, or scrap rubber.

Limitation Order L-272, issued February 22, places under restriction regulations control values, regulators, liquid level controllers, pyrometers, resistance thermometers, and other industrial type instruments.

Preference Rating Order P-89, as Amended January 30, 1943—Production of Chemicals, Maintenance, Repair and Operating Supplies—applies also to such materials as certain metals, wood, fabricated parts and equipment, and rubber (including synthetic).

Legal Notice

Baldwin Rubber Co., Pontiac, Mich., having processed 35 tons of reclaimed rubber for the manufacture of soles for civilian use in violation of Supplementary Order M-15-b, as Amended, under Suspension Order S-225, effective February 4 and expiring November 9, 1943, for a period of 30 days from the effective date is prohibited from using, processing, stamping, cutting, or in any manner changing the form, shape, or chemical composition of any crude rubber, latex, reclaimed rubber, scrap rubber, or synthetic rubber, except in the case of war orders or orders placed prior to February 1 by the Chemical Warfare Service of the United States Army.

Leo T. Crowley, Alien Property Custodian, Washington, D. C., on February 23 announced that vesting by his office of patents of foreign nations did not mean that rights of American licensees under seized patents were likewise vested. The announcement is based upon an opinion of the General Counsel to the Office of Alien Property Custodian which holds that an American licensee under a vested patent or patent application need not file a Form APC-1 to assert his claim to rights under his license. The opinion holds, further, that an American licensee under seized foreign patents or patent applications cannot be prejudiced by his failure to file a claim within one year of the date the patent or patent application is vested. The opinion applies equally to exclusive and non-exclusive licenses. Mr. Crowley's announcement does not relieve any American licensee from complying with the reporting or other requirements of APC General Orders Nos. 2, 11, and 12 and the regulations thereunder whenever such orders and regulations are applicable.

Pennsylvania Rubber Co., Jeannette, Pa., has elected Factory Manager P. C. Mathewson vice president in charge of factory operation. Mr. Mathewson, who came to the Pennsylvania company in October, 1941, has had extensive manufacturing experience in the rubber industry and for several years was factory manager of the Armstrong Rubber Co, West Haven, Conn.

Pennsylvania Rubber has also appointed C. E. Hannum assistant sales manager. He was with Cities Service Oil Co. (Del.) in various capacities for the past 14 years, was instrumental in developing a successful tire, battery, and accessories program for Cities Service, and recently was manager of tire, battery, and accessories sales.

Board of Economic Warfare, Washington, D. C., is establishing machinery for handling allotments of controlled materials under the Controlled Materials Plan and, in consequence, on January 29 issued Current Export Bulletin No. 70, "Controlled Materials Plan." Included in Class A products requiring a special form (CMP-4A) for an export license is certain rubber working machinery, such as hydroseparators and continuous ball mills.

United Carbon Co., Charleston, W. Va., is constructing a new plant at Ryus, Kans., to utilize the company's new furnace process for manufacturing a semi-reenforcing black needed in war production. The plant should be in full operation by the middle of this year. Plans likewise are being made to enlarge the facilities of this plant to double its output.

Defense Plant Corp., subsidiary of the RFC, both of Washington, D. C., has authorized contracts approximating $185,000 for the conversion of 100 railroad box cars for the transportation of fuel oil and petroleum products to the eastern Seaboard States, and the first of these cars should be received soon. Fifty are to be equipped with "flexi-tanks" by the Flexi-Tank Corp., Chicago, Ill., and the remaining 50 box cars will be equipped by the United States Rubber Co., New York, N. Y., with the "Mareng-cell",[1] a patent process owned by the Glenn L. Martin Co., Baltimore, Md. An average box car with a load capacity of 40 tons can thus transport 10,000 gallons of fuel oil or other vital petroleum products. ODT is sponsoring these projects.

[1] See INDIA RUBBER WORLD, Sept., 1942, p. 588.

LEGAL

Okonite Statement on Navy Suit

The indictment against me as President of The Okonite Co. has been dismissed, and the company, although it is not guilty of defrauding the Government, has pleaded nolo contendere, which means that the company will make no defense for the reason set forth below. The Okonite Co. is not guilty of defrauding the Government, nor does it consider that it is guilty of violating the anti-trust laws or any other laws, and by making the above plea, the company has not conceded that there has been any violation of the law, nor has the company been asked by the Department of Justice or any other department of the government to make such a concession.

The company has submerged its interests to the interests of the war and has accepted a settlement offered to it by the Department of Justice. The Okonite Co. was urged to accept this settlement by responsible government officials on the ground that such settlement will enable The Okonite Co. to continue to devote its entire time and energy to the production of supplies urgently needed for the war effort. A trial, which would last from six to eight weeks, would have taken from the service of The Okonite Co. for that entire period four men absolutely essential to the work of the company in the war effort and an additional number of men for the major part of that period. If these men were away from their duties production of war materials would drop materially.

Therefore, with no sense of guilt on the part of The Okonite Co., the issues of the action have, by this settlement, been put aside to permit the company to get on with the paramount business of contributing to the successful prosecution of the war.

FRANK C. JONES,
President, The Okonite Co.

The Okonite Co., Passaic, N. J., was one of nine companies recently charged with conspiracy to fix prices on Navy orders for $50,000,000 worth of cable. The other firms follow: Rockbestos Products Corp., New Haven, Conn.; Collyer Insulated Wire Co., Pawtucket, R. I.; General Cable Corp., New York, N. Y.; National Electric Products Corp., Pittsburgh, Pa.; Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.; General Electric Co., Schenectady, N. Y.; American Steel & Wire Co. of New Jersey, Cleveland, O.; and Phelps Dodge Copper Products Corp., New York. All pleaded nolo contendere and received fines totaling $77,500.

EASTERN AND SOUTHERN

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has made J. Warren Kinsman assistant general manager of the organic chemicals department to succeed the late Cesare Protto. J. A. Almquist, chemical director of the plastics department, succeeds Mr. Kinsman as assistant general manager of that department. Mr. Kinsman came to du Pont on May 1, 1915, and has served successively in the high explosives operating department, as supervisor in the "Fabrikoid" department, sales correspondent at Du Pont Chemical Works, assistant supervisor at the Carney's Point, N. J., plant, special assistant and then assistant director of sales of the dyestuffs department, director of sales of organic chemicals, manager of the alcohol division, and then assistant general manager of the plastics department.

Houdry Process Corp., Wilmington, Del., through President Eugene J. Houdry recently announced the development of a new catalytic process to produce increased quantities of a superior high octane aviation fuel. Refineries embodying this process, because of its adiabatic catalytic feature, are said to be simpler to construct than present-day catalytic cracking units. The Houdry process, developed early last year in a search for an economical and certain method for making butadiene, has been thoroughly tested in a semi-commercial plant built several months ago by Sun Oil Co. Houdry scientists thereupon turned their attention to adapting this adiabatic principle to the production of aviation fuel by catalytic cracking. A pilot plant proved successful; so now construction of commercial units is under way.

The Houdry company for about a year has been conducting extensive experiments, too, on methods of producing other rubber intermediates besides butadiene. To improve the quality of Buna S rubber new polymerization methods are being devised. More than 600 polymers have been made to discover a coordination of factors which would most greatly contribute to this synthetic rubber, uniformity of production, high tensile strength, elasticity, elongation, and low heat build up. Houdry, moreover, in cooperation with Socony-Vacuum Oil Co., for the past year has been working on adapting the Houdry process to the production of ethyl benzene and on the dehydrogenation of ethyl benzene to styrene.

Mixing Equipment Co., Inc., manufacturer of "Lightnin" propeller-type mixers, 1029 Garson Ave., Rochester, N. Y., has shifted its New York, N. Y., office from 377 Broadway to larger and more accessible quarters at 136 Liberty St. Glenn J. Moorhead, formerly Pittsburgh representative, has assumed the position of eastern divisional sales manager, with headquarters at the new location. C. F. Donovan will continue his duties as manager at the Liberty St. address. The firm also recently expanded its factory at Rochester.

Rubber Scarce at Notion Show

Any natural or synthetic rubber or rubber-like resinous materials used in the manufacture of notions and novelties exhibited at the Eighth National Notion & Novelty Exhibit, Hotel Pennsylvania, New York, N. Y., February 8-13, were products representing the tail-end of fast-disappearing stock in these types of wares. Despite almost a bankrupting bite the war has made into the novelty field, ingenuity and resourcefulness of the manufacturers have only served to increase the interest in the show to the extent that more distributers and manufacturers exhibited than last year.

Increased use of pyroxylin coating and similar resinous materials appeared in greater quantity to take the place of Pliofilm, and Koroseal and vinyl resin coatings in closet accessories, dress shields, nursery items, and other household goods. Distributers and manufacturers represented included: I. B. Kleinert Rubber Co., New York, which featured its "Softex" coated products and usual array of sanitary items, girdles, etc., and showed the results of research in finding a substitute for the rubber bathing cap by exhibiting a "Softex" coated and sealed rayon turban said to give adequate protection in keeping the wearer's hair substantially dry. W. H. Collins, New York, displayed skirt markers using rubber tubing and bulbs. Beyerle Mfg. Co., New York, offered some skirt and dress shields, pyroxylin coated. Aviatrix Co., New York, had a 3-in-1 shower cap—make up, facial, and/or as a substitute for rubber bathing caps. Richards, Boggs & King, Inc., New York, had a colorful display of the last of its Koroseal items, Byrene shower curtains, and Cordura yarn products, and introduced new merchandise of uncoated cottons and rayons. Plymouth Rubber Co., Inc., Canton, Mass., offered rubberless nursery items. Warren Featherbone Co., Three Oaks, Mich., was replacing its wide assortment of Koroseal products with pyroxylin coated rayons and cotton. M. Friedman Son, New York, showed a rainwear closet bag, pyroxylin coated, for rubbers, umbrellas, etc. A. Stein & Co., Chicago, Ill., supplemented its lastex girdle stock with girdles having inset panels of glove knit jersey. Seal-Sac, Inc., Fall River, Mass., had a comprehensive exhibit of garment bags, waterproofed nursery items, food bags, bowl covers, and lamp covers. Van Sen Products Co., New York, offered girdles of all types. A. J. Kasten, New York, had a few Cordura make-up capes and reversible rubber aprons, besides items made by Le Chalet consisting of food bags, bowl covers, and aprons. Several exhibitors who in the past had handled rubber or synthetic rubber products now introduced these products in cotton and rayon materials, using no coatings at all.

Standard Oil Co. (New Jersey), 30 Rockefeller Plaza, New York, N. Y., on February 1 announced that the first of the butadiene plants to produce raw material from petroleum for the government's synthetic rubber program began operations January 29 at Baton Rouge, La. The plant, the largest of its kind, has a rated capacity of 6,600 to 9,000 tons of butadiene annually, depending upon the quality of the petroleum fractions used as feed stock in the plant. This output is enough to produce rubber for 1,300,000 to 2,000,000 tires. The company further stated that three additional butadiene plants at Baton Rouge, being wholly or partly financed by the government, are well along toward completion and should be coming into production successively during the next three months.

Hercules Powder Co., Wilmington, Del., has announced the retirement of Gould Grant Rheuby as vice president, director, and member of the finance committee. He had been with the company since April 1, 1913, three months after its inception. In his place on the finance committee is Vice President Charles A. Bigelow, who has resigned from the executive committee. That vacancy and the one on the board will not be filled.

The company in its annual report revealed that last year it had spent $3,169,000 for plant expansions and improvements and about $2,012,000 for research.

John L. Grider, employment supervisor at the American Hard Rubber Co., Butler, N. J., recently resigned to become personnel manager with Gould & Eberhardt, Inc., manufacturer of gear cutting machines and shapers, Newark, N. J. Mr. Grider had joined American Hard Rubber in 1928 as employment supervisor at its College Point, L. I., plant and was transferred to Butler in 1932.

Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., has appointed Alphonse Pechukas research director of the Columbia Chemical Division and Franklin Strain assistant research director. Dr. Pechukas, who has been acting director since May, 1942, joined the company in 1937 as a laboratory research worker. Dr. Strain also has been with Pittsburgh Plate since 1937.

General Cable Corp., New York, N. Y., is selling the excess equipment at its Pawtucket, R. I., factory to be sent to Chile for a new copper plant there, according to Lewis F. Buckman, general manager of the cable plant.

Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., this year celebrates its fiftieth anniversary, as the original company was founded October 28, 1893.[1] Manhattan, with the plant in Passaic now employing nearly 4,000 workers and covering more than a million square feet of floor space, at present is entirely engaged in war work making mechanicals, asbestos friction materials, and abrasive wheels. Harry E. Smith is general manager; John H. Matthews, assistant general manager; and Charles T. Young, factory manager.

[1] For history of the company, see our Dec., 1938, issue, p. 63.

Rubber Announcements

United States Rubber Co., Rockefeller Center, New York, N. Y., has elected as a director, vice president, and member of the executive committee Henry S. Marlor, general manager of the footwear and the airplane fuel cell divisions. He started as a mill hand in one of the company's tire plants 32 years ago and became, successively, foreman, assistant superintendent, and factory manager in a number of tire and footwear plants; in 1927 he assumed responsibility for quality control of the products of 13 footwear factories; in 1929, Mr. Marlor became assistant general manager of the footwear division and in 1939 general manager; last year he also took on the airplane fuel cell assignment.

Elmer H. White, assistant general manager of U. S. Rubber's footwear division, who started with the company 39 years ago as a stock boy in its San Francisco warehouse, has been made general manager of the division, which now includes inflatable boats, barrage balloons, pontoons for bridge building, all types of footwear for the armed forces, army raincoats, and life-saving, diving, and fire-fighting suits.

Walter H. Norton, who began as a stock clerk with U. S. Rubber, 30 years ago, has been made assistant general manager of the footwear division. At the time of his promotion Mr. Norton was production manager of the four footwear division plants of the company.

William S. Long, since early 1942 Pacific Coast manager of U. S. Rubber's war products division, has been appointed operations manager of the company at Los Angeles, Calif., a new position prompted by the important war production assignments to the Los Angeles plant and the importance of the Los Angeles area in war production generally. Mr. Long began his rubber career after the World War when he joined the United States Rubber Export Co., with headquarters in Sydney, Australia. He held several posts in the Pacific hemisphere and was transferred to Los Angeles in 1935 as district manager of mechanical sales for the Pacific Coast division.

Paul Daley, public relations director at U. S. Rubber's Alice Mill, Woonsocket, R. I., on February 2 addressed the Woonsocket Council, Knights of Columbus, on production and labor policies, especially relating to women, at the plant. Also shown was the talking film, "Rubber Goes to War," depicting the manufacture of war goods. This is the new film put out by U. S. Rubber and is available without charge by writing to the Footwear Division at company headquarters.

Arthur Reeve, effective December 31, 1942, retired from U. S. Rubber with which he had been associated for 60 years, the last 15 of which as merchandise auditor. Mr. and Mrs. Reeve at present are living in California and may be reached at Darby Apts., 234 W. Adams Blvd., Los Angeles.

New Raft for Bomber Crews

A new, improved seven-man rubber life raft which will give aviators forced down at sea greatly added protection and comfort was demonstrated in Washington, D. C., recently by the United States Rubber Co., 1230 Sixth Ave., New York, N. Y. The new design includes a square rigged sail and fabric sea anchor and provides as well more space and makes the boat more seaworthy. A horizontal bulkhead divides the boat into upper and lower chambers so that the entire boat will remain inflated though pierced by a shark or other object from the bottom. Other equipment, which includes a fishing kit, repair and signal kits, first aid equipment, concentrated rations for 30 days, and, in some boats, a radio sending set, will be placed in a special waterproof container secured to the floor of the boat. Dimensions are approximately 12 feet long and 5 feet 8 inches wide. Weight, complete with equipment, is only 70 pounds. Like all such Army boats for rescue at sea, the top is orange-yellow for quick visibility, and bottom blue to avoid attracting sharks.

U. S. Rubber Reclaiming Co., Inc., 500 Fifth Ave., New York, N. Y., has appointed Vice President J. H. Nesbit executive vice president. Factory Manager John Plumb has been made vice president in charge of production; while Assistant Secretary A. F. Tallmer was named secretary.

Lee Rubber & Tire Corp., Conshohocken, Pa., held its annual meeting in New York, N. Y., January 28, at which all officers and directors were reelected as follows: president, Albert A. Garthwaite; executive vice president, W. W. Benner; vice president in charge of sales, Republic Division, O. S. Dollison; vice president in charge of manufacturing, Republic Division, Herbert W. Croysdale; vice president, Lee Tire & Rubber Co. of N. Y., Inc., H. Lawton Pettingell; comptroller, Arthur S. Pouchot; treasurer, Wm. B. Dunlap; secretary, Henry Hopkins, Jr.; assistant treasurer, Joseph J. Rooney; assistant secretary, John M. Dettra; assistant treasurer, Republic Division, Ernest M. Ikirt; assistant secretary, Republic Division, T. C. Boase; directors, John G. Bates, Stanton Griffis, Walter R. Herrick, Ambrose E. Impey, Geo. S. Mahana, Paul van Anda, and Messrs. Dettra, Garthwaite, and Hopkins. Mr. Garthwaite told stockholders that the company's business in '43 should be at least as good as in '42, both as regards to volume and earnings. Approximately 70% of Lee's production now goes to the government, 28% to commercial truckers, and 2% to passenger-car owners.

New Incorporations

Basic Materials, Inc., Wilmington, Del. Capital, 10,000 shares, no par value. Principal office, Corporation Trust Co., Wilmington. Rubber, latex, etc.

Fordham Tire Retread Co., Inc., New York, N. Y. Capital, 100 shares, no par value. Laxer & Shapiro, 1450 Broadway, New York, N. Y. Tires, tubes, etc.

National Synthetic Rubber Corp., Wilmington, Del. Capital, $1,000,000. Principal office, the Corporation Trust Co., Wilmington. R. F. Lewis, L. H. Herman, S. M. Brown, all of Wilmington. Butadiene, styrene, synthetic rubber.

Rubbercraft Corp. of America, Inc., New Haven, Conn. Capital, 100 shares, $10 par. A. R. Alderman, president, New Haven; R. J. Levine, vice president, and I. H. Abkowitz, secretary-treasurer, both of Ansonia, Conn.

Improved Life Raft for Plane Crews Forced Down at Sea

OHIO

General Tire to Build Synthetic Rubber Plant

The General Tire & Rubber Co., Akron, will operate, under government contract, a synthetic rubber plant in Texas, according to President William O'Neil. General Latex & Chemical Corp., Cambridge, Mass., will be associated with General Tire in the operation of the plant, already under construction. Harvey J. Elwell, president of General Latex, will be general manager of the new enterprise although General Tire will handle operations. Humble Oil Co., whose necessary buildings are under way in the same town, will provide butadiene.

The contract was signed with the Rubber Reserve Co. on February 8, and the plant will be leased from Defense Plant Corp., also a RFC subsidiary. Completion of the synthetic rubber and butadiene plants is scheduled for June.

Research on Synthetics and Plastics

General Tire has enlisted the scientific knowledge of Carnegie Institute of Technology and the Research Foundation of Purdue University to further improvements in synthetic rubber and plastics. Scientists of both institutions will conduct extensive research along these lines, under the supervision of Webster N. Jones, director of engineering and chemical research for Carnegie Institute.

J. C. Warner, head of the chemistry department at Carnegie Tech, with a group of chemists from that school inspected various synthetic plants in Akron and conferred with General Tire chemists and engineers. A similar inspection recently was made by a group from Purdue's chemistry department, led by H. B. Hass, department chairman, and G. Bryant Bachman, his assistant.

Advertising to Stress Tire Conservation

General Tire for 1943 plans its most extensive advertising campaign, using newspapers, magazines, and billboards and featuring rubber conservation, Advertising Manager Ralph H. Harrington told dealers in a series of conferences throughout the nation last month. Stressed was the importance of tire saving until the synthetic rubber program is well into actual production. Among those attending the meetings were: L. A. McQueen, General's vice president in charge of sales; E. C. Leach, technical consultant in the production division; and W. H. Mason, director of public relations.

Seiberling Rubber Co., Akron, recently held its annual meeting of stockholders at which all directors were reelected as follows: F. A. Seiberling, chairman of the board; J. P. Seiberling, president; C. W. Seiberling, first vice president; H. P. Schrank, vice president in charge of production; J. L. Cochrun, vice president in charge of sales; W. A. M. Vaughan, vice president and treasurer; A. C. Blinn; C. W. Enyart; and Robert Guinther, of the law firm of Slabaugh, Seiberling, Guinther, and Pflueger. At the meeting J. P. Seiberling advocated formation of a Committee for Economic Development for the rubber industry to aid in formulating wise and sound solutions to the problems of post-war reconstruction and adjustment.

Goodrich News

The B. F. Goodrich Co., Akron, has made John M. Davies director of physical research. He has been in the company's research division since 1926 and since 1939 was a group head in the physical research department.

Harry L. Mahoney, succeeding F. J. Rees, now manager of special accounts in Goodrich's associated tire and accessory division, has been made advertising and sales promotion manager of the division. Mr. Mahoney, in the rubber industry since 1930, joined Goodrich in California on retail sales promotion, later went to the district office in Cleveland, then became sales promotion manager in Washington, D. C., and five years ago was transferred to the company's advertising department in Akron.

Goodrich also, according to J. S. Pedler, manager of the aeronautic division, is manufacturing a "winter tire" for aircraft that has parallel rows of steel coils embedded in the tread so that the edges grip on ice and snow to prevent skidding. The steel coils are bonded to the rubber around the tire circumference during vulcanization.

The largest single order for conveyer belt ever received in the rubber industry, totaling more than 66 miles, has been awarded Goodrich. The belt, part of a recent huge war order, went into production immediately in one of the company's plants now engaged in manufacturing rubber and synthetic rubber products for the armed forces. It will require 50 standard railroad cars to move the belting shipment when completed.

S. L. Brous, in charge of technical service and distribution of raw plastic materials, recently addressed the Electric Club at Toronto, Ont., Canada, on the advantages of synthetic rubber and its position after the war.

Search for Rubber Results

Nearly 2,000 varieties of plants found in this hemisphere have been tested for rubber since March, 1942, by the department of agriculture at Cornell University, Ithaca, N. Y. This search for native plants as a source of natural rubber was undertaken by Cornell scientists working with the Goodrich company, which gave financial aid to the project. Most plants so far examined show rubber content too low for commercial use, but some contain sufficient resin to warrant further study as possible sources of materials for synthetic rubber.

A new quick process to indicate how much rubber and resins plants contain has been developed by the university researchers. Only five minutes are required to give an approximate idea of the natural rubber in plant tissues.

On the basis of the Cornell studies the Russian dandelion appears the most promising emergency rubber-bearing plant for growth in the North. Its rubber content can be easily obtained by mechanical means, and after rubber is extracted from the roots it can also be used for alcohol production. Prof. Lewis Knudson, directing Cornell's plant research program, said that in normal times the yield obtained from this variety of dandelion would hardly pay the cost of production here even though the seed and the residue of the crop could be used.

The Goodyear Tire & Rubber Co., Akron, has announced that Fred W. Climer, after 3½ months with the WPB in Washington, D. C., has returned to Goodyear as assistant to President E. J. Thomas and as such will direct all personnel activities of the Goodyear company and of Goodyear Aircraft Corp. Mr. Climer, with Goodyear nearly 26 years, was superintendent of the factory in Argentina 3½ years, Akron factory personnel manager four years, and personnel director at Goodyear four years.

R. S. Pope, director of personnel at Goodyear Aircraft until he assumed Mr. Climer's duties when the latter went to Washington last October, will remain as director of personnel for Goodyear Tire & Rubber Co.

Harold A. Stalder, secretary and follow-up man for J. J. Blandin, manager of Goodyear's crude rubber division, has been appointed junior administrative assistant for the Rubber Reserve Corp. in Brazil. Mr. Stalder, with Goodyear since 1926, will be stationed at Manaos to assist in the development and procurement of crude rubber from the Amazon River district.

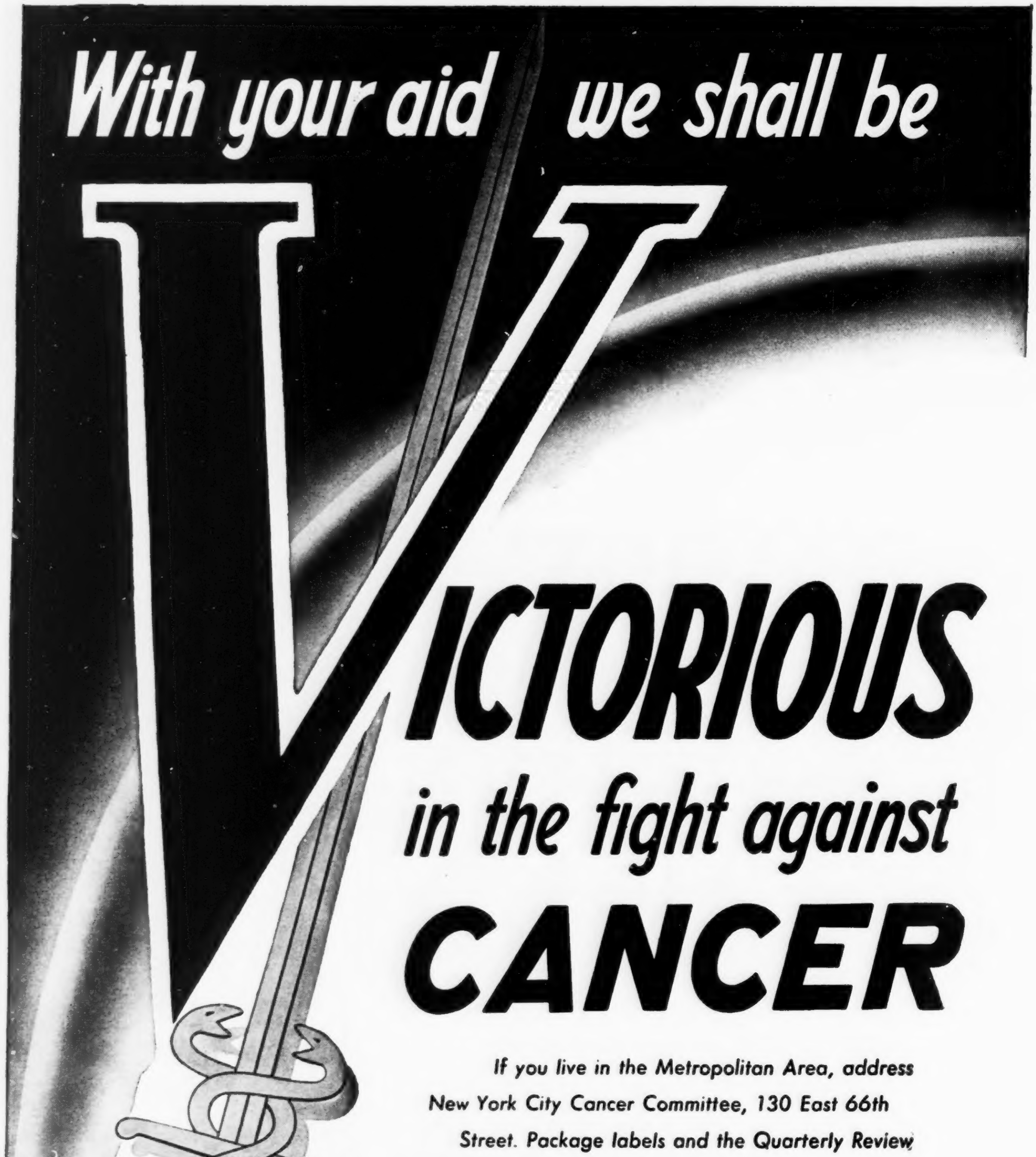
Goodyear has transferred Henry G. Harper, Jr., western division sales manager, from Los Angeles, Calif., to Akron as merchandising manager of the retail stores division. His successor is D. W. Sanford, manager of the northeast division, who in turn is succeeded by F. W. McConky, Jr., manager of the south central division. To that post has been named J. A. Bailey, district manager at Dallas; while V. Holt, in the office of the manager of tire departments on special work, becomes assistant division manager of the north central division. Assigned to Mr. Holt's former position is Gordon J. Ott, manager of motorcycle and bicycle tire sales.

R. H. Naylor, assistant general credit manager for Goodyear since 1935, having received his commission as lieutenant in the Navy, on February 1 reported to the first Naval District, where he has been assigned to the Boston Navy Yard as assistant to the supply officer.

Goodyear reported that it has developed a Chemigum (synthetic rubber) of sufficient flexibility and resilience to replace other types of compounds for use in hydraulic accumulators in airplanes.

Goodyear has revealed that with the cooperation of the Peruvian Government, it has built a tire factory at Lima, Peru, which is now ready to start operations.

Goodyear Aircraft recently completed construction of the Goodyear FG-1, the first Akron-built combat plane.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350 MADISON AVENUE, NEW YORK, NEW YORK

NEW ENGLAND

Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., has taken on as a technical representative, with headquarters in Boston, Josef D. Zeller, who will assist Fred H. Amon in rubber development work in connection with the production of channel and furnace process carbon blacks. Mr. Zeller previously had been in the development department of the United States Rubber Co. at Detroit, Mich.

The Cabot company expects to have in commercial production about April 1, Sterling furnace-type carbon black at its Guymon, Okla., plant. Working samples of this soft black will be supplied gratis to those interested.

The Bristol Co., Waterbury, Conn., has announced three executive changes. L. G. Bean, since 1939 vice president and general sales manager, has been made vice president in charge of engineering and sales. Harry E. Beane, since 1936 field sales manager and supervisor of the company's district managers and sales and service engineers, becomes sales manager; while the assistant sales manager is E. L. Stilson, lately of the field engineering department.

The Stanley Chemical Co., East Berlin, Conn., has added to its technical staff A. J. Cofrancesco, who will devote his efforts to the field of synthetic chemistry and the development of rubber-like materials. Dr. Cofrancesco graduated from Wesleyan in 1933, receiving his B.A. with distinction in chemistry and his M.A. in 1934. During 1934 and 1935 he was with the Guggenheim Corp., New York, and the following two years were spent in the laboratory of Stanley Chemical Co. In 1939 he received his doctor's degree from the Yale Graduate School of Chemistry, and for the past three years was with the Calco Chemical Co.

Capt. Nelson W. Pickering, USNR, has resigned as president of Farrel-Birmingham, Inc., Ansonia, Conn., as he was ordered to report for active duty, February 1, in the United States Navy as commander of the Navy Section Base at New London and commander of local defense forces in that area. A graduate of the United States Naval Academy in 1908, he spent many years in the service before joining the roll department of Farrel Foundry & Machine Co. in 1919, becoming assistant manager and then manager of the department. In February, 1930, he was elected president of Farrel-Birmingham with executive direction of the company's three plants at Ansonia, Derby, Conn., and Buffalo, N. Y. Captain Pickering has long been active also in the civic and industrial life at Ansonia. A testimonial dinner was given him January 25 by his civic and business associates, at the Hotel Clark, Derby, when he received a handsome, suitably inscribed silver tray.

Farrel-Birmingham on February 18 held its annual stockholders' and directors' meeting at Ansonia at which the following officers and directors were elected: Franklin Farrel, Jr., chairman of the board and of the finance committee; A. G. Kessler, Carl Hitchcock, Austin Kuhns, R. A. North, vice presidents; F. M. Drew, Jr., treasurer; George C. Bryant, secretary; W. B. Marvin, assistant secretary; directors, F. H. Banbury, Charles F. Bliss, Alton Austin Cheney, Julius G. Day, Franklin Farrel, 3rd, W. A. Gordon, Edward H. Green, Franklin R. Hoadley, Emil Berges, and Messrs. Farrel, Drew, North, Kuhns, Hitchcock, Kessler, Marvin, and Bryant.

Nelson W. Pickering

CANADA

Controller of Supplies, Ottawa, Ont., is releasing sufficient reclaimed rubber to manufacture 4,500,000 rubber heels; 1,500,000 will be for military requirements, and the balance will be apportioned to shoe factories for civilian shoes. Though the quantity available for the shoe repair trade will be comparatively small, it comes before the old stocks have been liquidated.

A certain amount of rubber reclaim is reported to be released by the Canadian Government for the production of utility canvas footwear by rubber footwear manufacturers, who have stocks of uppers fabric on hand.

The rubber to be released for winter lines, it is also reported, will be "sufficient for essential civilian requirements"—a more generous allotment than had first been anticipated.

The Canadian Army, in order to save on rubber and gas, is using training vehicles only four days in seven. Also the Army is clamping down more forcibly than ever on speeding military vehicles and severely punishing offending drivers.

M. H. Hudspeth, former factory manager of Canadian Lastex, Ltd., Montreal, P. Q., is attending the officers' training course at Brockville, Ont. He is attached to the Royal Regiment (Machine Gun).

The Motor Carriers' Association of British Columbia, having long agitated for tires for motor sidecars used for delivery and messenger services, a type not covered in the rationing regulations, has secured permission for retreads and used tires for these vehicles if they are engaged solely in war work.

L. K. Falkenhagen, sales manager of Joseph Stokes Rubber Co., Ltd., Welland, Ont., was recently elected secretary of the Canadian Section of the Society of the Plastics Industry, Inc.

R. V. Nicholls, assistant professor of chemistry of the Faculty of Science, McGill University, Montreal, P. Q., in a radio address February 8 stated that it will be two more years before Canada and the United States will be able to produce synthetic rubber in quantity, and he urged more stringent conservation of essential materials.

R. S. Jane, formerly with Shawinigan Chemicals, Ltd., Montreal, P. Q., has become head of the newly created industrial research department of The Shawinigan Water & Power Co., Ltd., Montreal.

M. F. Anderson, has been appointed general manager of Naugatuck Chemicals, Ltd., Elmira, Ont., and the Rubber Regenerating Division, Montreal, P. Q., now known as the Chemical & Regenerating Division of Dominion Rubber Co., Ltd. Mr. Anderson continues as director of development with headquarters in Montreal.

H. H. Bloom, administrator of farm machinery for the Wartime Prices & Trade Board, told the recent annual meeting of the Ontario Plowmen's Association in Toronto, Ont., that decision had been made to make tires available for replacement on tractors, combines, and heavy farm equipment, but not for farm trucks or lighter vehicles.

Montreal, P. Q., in a new drive for needed salvaged rubber is asking all local footwear retailers and the public to turn in all old rubbers and discarded sport shoes with any rubber content.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., last month held its annual meeting at which all directors were reelected.

W. M. Jeffers, U. S. Rubber Director, in a talk at Toronto, Ont., stated before synthetic rubber plants reach maximum output a low period for rubber stocks in North America will occur during August-October this year, in which only 120,000 tons will be available. He said that on January 1, 400,000 tons of rubber were in stock. Crude rubber imports this year are estimated at 36,000 tons, and 354,000 tons of synthetic rubber should be produced. A total of 577,000 tons is already allocated; 325,000 for military use, 141,000 for lend-lease, and 111,000 for civilian use, leaving 213,000 tons in stock at the year-end. Mr. Jeffers emphasized, however, that these figures were based on maximum production.

OBITUARY

Louis P. Arnold

FUNERAL services were held January 27 at Norwalk, Conn., for Louis Philip Arnold, director and former vice president of the Norwalk Tire & Rubber Co., who died at his home there January 25 of coronary thrombosis. Born in Barree, Pa., July 19, 1884, Mr. Arnold attended Juniata College. He became affiliated with the rubber industry early in his career and before coming to Norwalk held positions with The B. F. Goodrich Co., Akron, O., with the old Swinehart Rubber Co. as foreman of auto tire building, with Diamond Rubber Co. as factory superintendent, and finally with Norwalk Tire as factory manager from 1913-1939. Since his retirement four years ago he was a member of the executive board. Some time ago, however, Mr. Arnold returned to active duty at Norwalk Tire to take charge of the manufacture of rubber boats or rafts.

The deceased was an Odd Fellow and a Mason.

He was buried in Riverside Cemetery, January 27.

His wife, two sons, two daughters, five grandchildren, one brother, and two sisters survive him.

Mason Hulett

MASON HULETT, of Farrel-Birmingham Co., Inc., Ansonia, Conn., died suddenly February 7 in Washington, D. C. He had been with the company's New York office for the past nine years as sales engineer and consultant on gears. Previously he had been New York representative for the Falk Corp. At the time of his death Mr. Hulett was on leave of absence from Farrel-Birmingham and was serving as chief of the Industrial Gear and Speed Reducer Unit, Material Handling Equipment Branch, War Production Board, in Washington.

Mr. Hulett was a graduate of Rensselaer Polytechnic Institute, Class of 1914, with a degree of Civil Engineer. He was born in Granville, N. Y., in 1891.

He is survived by a son and by two brothers.

Robert J. Wilkie

FOLLOWING a brief illness Robert J. Wilkie, 70, vice president of Stowe-Woodward, Inc., Newton Upper Falls, Mass., with which he had been associated 30 years, died February 1. His entire business career had been devoted to the manufacture of rubber products, and he was a pioneer in the hard rubber field. For a time Mr. Wilkie had been president of the Wilkie Rubber Mfg. Co., Lynn, Mass., of which he had been an incorporator (September 5, 1908).

Funeral services were held from his home in Newton Centre on February 3, 1943, with interment in the Newton Cemetery.

He leaves two daughters and a son.

Kreigh B. Ayers

FUNERAL services were held February 12 for Kreigh B. Ayers, 52, research chemist at Goodyear Tire & Rubber Co., Akron, O., who succumbed to a heart attack February 10. A graduate of Gallaudet College, from which he later received an honorary degree, Mr. Ayers had been with Goodyear for over 25 years. Recently he had been loaned to Goodyear Aircraft Corp. because of his extensive knowledge of electro-chemistry.

The deceased was past president of the Ohio Deaf Mute Alumni Association and of the Ohio Deaf Motorists' Association. Also, he was a member of the Akron Society for the Deaf, National Association of the Deaf, and National Fraternal Society for the Deaf.

He leaves a wife, a daughter, a son, and a grandson.

Harold H. Bedell

HAROLD H. BEDELL, secretary of the old Bourn Rubber Co., Providence, R. I., died January 26 at his home in Edgewood, R. I., after a year's illness. Mr. Bedell was born in Bristol, R. I., September 8, 1872. He attended Classical High School, and after graduation in 1890, entered the Bourn company, which he served until his retirement in 1925.

His wife, two daughters, and a son survive him.

Gordon Bowman

GORDON BOWMAN, 51, of the Dominion Rubber Co., Ltd., Montreal, P. Q., Canada, passed away suddenly on February 3, at St. Jerome, P. Q. Mr. Bowman was a native of Kitchener, Ont., and in 1913 began his rubber career with the company's Merchants Factory, Kitchener. In 1918 he transferred to the Granby factory, Granby, P. Q., to become superintendent a year later. In 1927 the deceased was put in charge of Dominion Rubber's footwear pattern school in Montreal and in 1929 was sent to the footwear construction and development division where he remained until his death.

The funeral took place in Montreal on February 5; interment was in Mount Royal Cemetery.

He leaves a wife, two brothers, and four sisters.

William T. Bull

ON FEBRUARY 8, William T. Bull, 49, personnel officer of the Firestone Rubber & Latex Products Co., Fall River, Mass., died at his home in Newport, R. I., after a brief illness. Born in Newport, the deceased was educated at Cambridge Latin School, then St. George's School, and in 1931 was graduated from the National Recreation School in New York, N. Y. He became associated with Firestone a little over a year ago after resigning as athletic director of the Newport Athletic Commission.

Mr. Bull leaves a wife and two children.

Walter C. Keys

A HEART attack proved fatal January 25 to Walter Cole Keys, chief engineer of the new products department, mechanical division, of the United States Rubber Co. at Detroit, Mich.

The deceased was born June 9, 1885, in Glendale, O., and was a graduate of the University of Michigan. From 1913-17 he was assistant chassis engineer for the Cadillac Motor Co. Detroit, Mich. In 1917 he joined The Standard Parts Co., Cleveland, O., in an engineering capacity and remained until 1922. Then the Gabriel Snubber Co. employed him as factory representative and distributor until 1926. In 1927 he joined U. S. Rubber.

Mr. Keys was a member of the Society of Automotive Engineers, American Society of Mechanical Engineers, and the Detroit Engineering Society. Many of the papers he wrote were presented before important engineering societies.

Funeral services were held January 27 in Detroit, and burial took place the following day in Cincinnati.

Survivors include his wife, a daughter, and a sister.

MIDWEST

Illinois Institute of Technology, Chicago, Ill., on February 4 graduated 72 students who spent 16 weeks studying synthetic rubber under H. A. Winkelmann, who also presided at the graduation ceremonies. As guests at the exercises were 25 members of the Chicago Group, Division of Rubber Chemistry, American Chemical Society, each of whom presented a lecture to the class. Employed in industry, the 72 students worked during the day and attended school at night. All are college graduates in chemistry or chemical engineering; three are women. Training was paid for by the government as synthetic rubber is one of the courses offered at the Institute under the auspices of the U. S. Office of Education's Engineering, Science, and Management War Training program. This was the second such class to graduate; 96 students completed a similar course last spring. On February 22 a new class started.

National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., will hold its thirtieth annual convention and wartime conference at the Hotel Sherman, Chicago, Ill., March 16 and 17. There will be meetings of the affiliated organizations including the Scrap Rubber Institute. David Feinburg, of David Feinburg Co., Medford, Mass., has been renominated president.

Thirty-three rubber firms in the Midwest recently paid 16,145 workers $735,000 in salaries, respective gains of 3.5% and 5.8% over the previous month.

FINANCIAL

Armstrong Rubber Co., West Haven, Conn. Year ended September 30, 1942: net profit, $380,559, equal to $5.03 each on 75,690 shares of A and B stock, against $478,107, or $6.32 each on 75,668 shares, in the preceding 12 months.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. For 1942: consolidated net income (including $20,000,000 of dividends on General Motors common stock), $63,941,275, equal to $5.07 each on 11,107,840 common shares outstanding, compared with $90,401,470 (including $37,500,000 of GM dividends), or $7.49 each on 11,054,973 common shares in 1941; sales volume, $498,313,857, contrasted with $480,109,939.

Flintkote Co., New York, N. Y., and subsidiaries. For 1942: consolidated net income, $1,727,154, equal, after preferred dividends, to $2.18 each on 713,706 common shares, contrasted with $1,737,661, or $2.34 each on 699,706 common shares, in 1941; sales, $33,006,953 (a record high), against $27,151,169.

General Tire & Rubber Co., Akron, O. Year ended November 30, 1942: net profit, $1,382,963, equal to $2.37 a share, against $1,218,569, or $2.05 a share in the previous fiscal year; current assets, $14,979,110; current liabilities, $4,935,302.

Goodyear Tire & Rubber Co., Akron, O. For 1942: net profit, $14,370,911, equal to $5.46 a common share, against $12,831,307 in 1941; consolidated net sales, $451,493,034, against $330,599,674; losses of Far Eastern holdings seized by enemy, $8,000,000; refund to government after renegotiating of war contracts, $14,000,000; taxes, $30,018,052.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., Canada, and subsidiaries. For 1942: net profit, $1,918,557, against $1,603,089 in 1941; reserve for contingencies, $500,000; reserve for adjustments that may arise in final settlement of prices under government contract, $2,359,782.

Hercules Powder Co., Wilmington, Del. For 1942: net earnings, $5,546,980, equal, after preferred dividends, to $3.81 each on 1,316,710 common shares outstanding, against $6,098,712, or $4.23 a share, in 1941; taxes, $20,513,288, against $14,163,467; provision for contingencies, $1,500,000, against $500,000; net sales and operating revenues, $114,378,235, against $85,612,161; current assets, $57,288,890, current liabilities, $31,193,931, compared with $48,852,373 and $26,899,704, respectively, at the end of 1941.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. For 1942: net income, $8,671,050, equal, after preferred dividends, to $2.91 a common share, against $16,532,540, or $6.21 a share prior to a 10% stock dividend paid in December, 1941.

Dividends Declared

Company		Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.		Com.	$0.25	Mar. 31	Mar. 19
American Hard Rubber Co.	7%	Pfd.	1.75 q.	Mar. 31	Mar. 19
Brunswick-Balke-Collender Co.		Com.	0.25	Mar. 15	Mar. 1
Canada Wire & Cable Co., Ltd.		Class B	0.25 reduced	Mar. 15	Feb. 28
Canada Wire & Cable Co., Ltd.		Class A	1.00 q.	Mar. 15	Feb. 28
Canada Wire & Cable Co., Ltd.	6½%	Pfd.	1.62½	Mar. 15	Feb. 28
Crown Cork & Seal Co.		Pfd.	0.56¼ q.	Mar. 15	Feb. 26
Dominion Textile, Ltd.		Com.	1.25 q.	Apr. 1	Mar. 5
Dominion Textile, Ltd.	7%	Pfd.	1.75 q.	Apr. 15	Mar. 15
E. I. du Pont de Nemours & Co., Inc.		Com.	1.00 interim		
E. I. du Pont de Nemours & Co., Inc.		Pfd.	1.12½ q.	Apr. 24	Apr. 9
Flintkote Co.		Com.	0.25 irreg.	Mar. 15	Mar. 5
Flintkote Co.	$4.50	Cum. Pfd.	1.12½ q.	Mar. 15	Mar. 5
Flintkote Co.		Pfd.	1.12½ q.	Mar. 15	Mar. 5
General Electric Co.		Com.	0.35	Apr. 26	Mar. 12
B. F. Goodrich Co.		Pfd.	1.25 q.	Mar. 31	Mar. 12
Hercules Powder Co.		Com.	0.50	Mar. 25	Mar. 12
Hewitt Rubber Corp.		Com.	0.25 q.	Mar. 15	Mar. 2
I. B. Kleinert Rubber Co.		Com.	0.30	Mar. 12	Mar. 1
Minnesota Mining & Mfg. Co.		Com.	0.30	Mar. 11	Mar. 4
Raybestos-Manhattan, Inc.		Com.	0.37½	Mar. 15	Feb. 26
Russell Mfg. Co.		Com.	0.50	Mar. 15	Feb. 27
Thermoid Co.		Pfd.	0.75 q.	Mar. 15	Mar. 3
United Elastic Corp.		Com.	0.35 inc.	Mar. 24	Mar. 4
United States Rubber Co.		Pfd.	2.00 irreg.	Mar. 26	Mar. 12

Mohawk Rubber Co., Akron, O. For 1942: net income, $348,947, equal to $2.46 each on 141,638 common shares, against $206,280 or $1.46 a share, in 1941.

New Jersey Zinc Co., New York, N. Y. For 1942: net income, $7,231,396, or $3.68 a share on outstanding stock, against $9,592,871, or $4.88 share in 1941.

Rome Cable Corp., Rome, N. Y. December quarter: net profit, $97,546, equal to 51¢ a share, against $51,620, or 27¢ a share, in the September quarter, and $150,059, or 79¢ a share, in the quarter ended December 31, 1941. Nine months ended December 31, 1942: net profit after $503,516 taxes, $215,064, or $1.13 a share, against $392,441, or $2.07 a share after $608,966 taxes, in the 1941 period.

United Elastic Corp., Easthampton, Mass., and wholly owned subsidiary. For 1942: net profit, $564,511, equal to $3.77 a share, against $368,959, or $2.46 a share, in 1941.

United Carbon Co., Charleston, W. Va., and subsidiaries. For 1942: net profit, $1,780,520, or $4.47 a share, against $1,711,547, or $4.30 a share in 1941; income and excess profits taxes, $1,669,200 after deducting post-war credit of $86,800, against $1,145,000 in '41; net sales, $10,314,859, down $1,087,217 from the year before.

United States Rubber Co., New York, N. Y. For 1942: net earnings, after all charges including war losses of $15,487,414, $8,381,011, equal, after preferred dividends, to $1.82 each on 1,739,092 common shares, compared with $13,662,658, or $4.86 a share, in 1941; consolidated net sales, $290,992,037, against the record of $315,345,328 in 1941; current assets, $138,670,730; current liabilities, $35,511,957; foreign assets, after writing off plantations and other war losses, $16,213,048, of which $12,491,617 is invested in Canada; inventories, $78,127,630, against $76,665,649 the year before.

Tentative Specifications

(Continued from page 583)

CALCULATIONS:

$$\% \text{ Soap} = \frac{\text{ml. HCl} \times \text{equivalent grams of soap per ml. HCl} \times 100}{\text{Weight of sample}}$$

E. ASH DETERMINATION. Ash the sample in a crucible previously ignited to constant weight in a muffle furnace by heating at the following rate:

Time, minutes	0	5	10	15	70	75	80	85	145
Temperature ° C.	R.T.	100	200	300	300	400	500	550	550

Remove the crucible from the furnace, cool, and weigh.

$$\% \text{ Ash} = \frac{\text{Wt. of ash}}{\text{Wt. of sample}} \times 100$$

If no furnace is available, distill off the rubber or organic material over a very small flame, not allowing it to catch fire, and ignite gently until burnt clean, cool, weigh, and calculate ash.

III. Physical Tests

A. PLASTICITY. Plasticity to be determined on Mooney viscosimeter with one minute warm-up, reading at 1½ minutes after starting the motor. Viscosity limits 45 to 60 at 212° F.

B. RECIPE

Polymer as received	100.0
Channel black*	50.0
Zinc oxide	5.0
Mercapto benzo-thiazol	1.5
Sulphur	2.0
Refined coal-tar rubber softener	5.0

Batch size equal to three times recipe in grams.

* Specify as to so-called coarse Channel Black such as Cabot #9, WYEX, W-6, Kosmos-77, Continental-AA, or similar blacks proved to be equivalent.

C. MILLING PRACTICE

Equipment	ASTM D15-41
Mill opening	ASTM D15-41
Temperature of mill, 70 to 100° F. at start; maximum 130° F.	

ORDER OF MILLING

1. Two tight refinings on the crude rubber.

2. Adjust mill to proper opening to give continuous sheet on the mill.

3. Break down rubber 10 minutes, making ten 3/4 cuts each way.

4. Add channel black slowly, cut two times each way—total time 10 minutes.

5. Add softener in one minute.

6. Add zinc oxide, accelerator and sulphur in one minute.

7. Cut three 3/4 cuts each way.

8. Roll and pass the stock endwise through mill six times.

9. Sheet out and allow to rest eight hours. (Total time of mixing 28 minutes maximum.)

10. Refine two passes through tight mill, sheet to desired thickness to conform to ASTM 15-41 tensile sheets, and cure within three hours.

D. CURING AND TESTING

50 Minutes @ 45 pounds steam—ASTM mold.

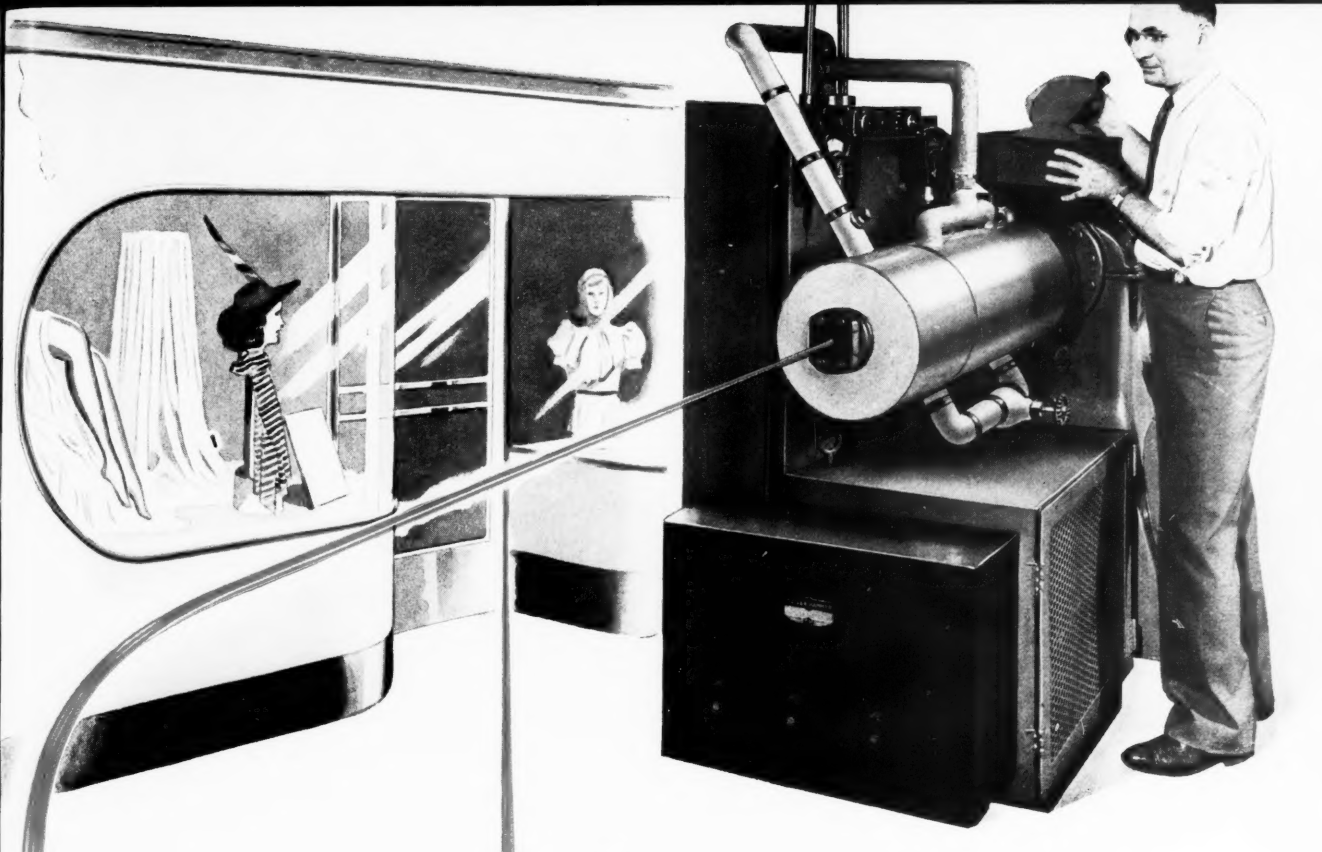
Tensile	2500 pound minimum	Testing according to ASTM D412 - 41 sections 6, 7, 8 and D15-41.
Elongation	450% minimum	
Modulus @ 300%	800 minimum 1400 maximum	

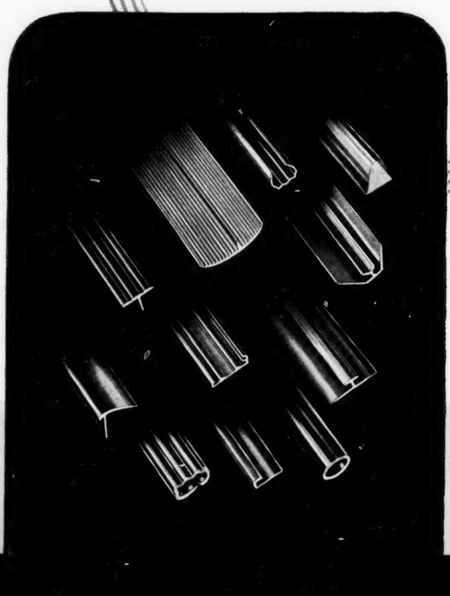
February 6, 1943.

Tire and Tube Quotas for March, 1943*

United States and Territories Region		Passenger and Motorcycle, Etc. New Grade I Tires	New Grade II Tires	Grade III Tires	Tubes	Truck and Bus, Etc. Tires	Recapping Services	Tubes	Farm Tractor and Implement Tires
No. 1	Maine	1,588	1,850	3,306	4,421	2,390	4,148	2,481	311
	New Hampshire	939	1,055	2,309	3,151	1,079	2,667	1,366	121
	Vermont	657	456	1,082	1,371	950	1,261	866	132
	Massachusetts	7,841	6,653	18,380	19,653	5,211	7,726	5,001	283
	Rhode Island	1,607	1,234	1,926	2,811	1,045	1,509	990	41
	Connecticut	3,213	4,289	6,166	9,947	3,465	6,091	3,621	202
Boston	Sub-Total	15,845	15,537	33,169	41,354	14,140	23,402	14,325	1,090
No. 2	New York State	26,084	14,121	39,617	49,696	15,803	21,448	14,549	2,239
	New Jersey	7,414	6,337	10,939	15,684	5,833	9,068	5,728	476
	Pennsylvania	18,118	19,971	45,826	52,345	16,124	28,975	17,046	2,082
	Delaware	663	605	1,525	1,777	742	1,296	773	105
	Maryland	7,039	7,249	19,164	17,354	4,858	6,749	4,521	398
	District of Columbia	7,042	973	2,288	7,117	1,113	1,788	1,111	..
New York	Sub-Total	66,360	49,256	119,359	143,973	44,473	69,324	43,728	5,300
No. 3	Ohio	16,277	17,729	36,178	44,128	13,453	19,143	12,661	3,473
	Kentucky	5,232	5,979	16,411	15,359	5,229	10,283	5,802	467
	West Virginia	3,593	4,015	7,782	9,702	4,199	7,796	4,516	139
	Michigan	13,325	10,188	22,261	26,261	9,728	10,924	8,250	2,551
	Indiana	8,036	8,932	19,389	23,426	8,420	11,767	7,857	2,795
Cleveland	Sub-Total	46,463	46,843	102,021	118,876	41,029	59,913	39,086	9,425
No. 4	Virginia	5,855	5,531	11,465	14,449	6,783	14,564	7,907	467
	North Carolina	7,748	6,468	21,160	21,825	9,088	20,706	10,963	494
	South Carolina	4,876	3,110	8,626	10,468	3,729	7,436	4,170	208
	Georgia	7,492	5,889	17,464	19,033	7,637	15,904	8,749	409
	Florida	5,093	3,854	9,836	11,316	6,221	12,415	6,959	314
	Tennessee	6,850	5,970	15,988	16,908	7,079	13,912	7,851	461
	Alabama	7,646	8,455	18,882	21,559	6,133	12,426	6,919	332
	Mississippi	5,349	3,272	10,115	10,890	5,023	7,911	4,964	474
Atlanta	Sub-Total	50,909	42,549	113,536	126,448	51,693	105,274	58,482	3,159
No. 5	Missouri	10,829	6,445	20,052	20,575	9,251	14,780	9,207	1,862
	Kansas	5,311	4,143	14,026	12,410	6,704	3,906	6,113	3,487
	Oklahoma	8,404	5,253	15,012	15,828	7,228	9,333	6,507	2,140
	Arkansas	3,810	2,979	9,824	9,153	5,360	8,720	5,383	565
	Texas	20,747	11,578	29,555	36,684	22,593	29,781	20,528	4,700
	Louisiana	8,087	3,789	12,805	11,948	6,327	6,669	5,231	426
Dallas	Sub-Total	57,188	34,187	101,274	106,598	57,463	78,189	52,969	13,181
No. 6	Illinois Incl. Met. Chicago	17,734	11,678	26,361	32,514	16,204	15,805	13,002	4,899
	Iowa	5,437	3,086	14,873	12,075	6,241	5,472	4,817	4,948
	Nebraska	3,507	2,229	7,624	7,130	4,805	4,241	3,717	2,598
	North Dakota	1,139	650	2,700	2,271	1,793	1,460	1,349	1,813
	South Dakota	1,232	984	3,789	2,976	2,101	2,290	1,760	1,618
	Minnesota	4,682	2,086	8,717	8,047	4,436	5,316	3,866	4,030
	Wisconsin	5,547	3,639	11,951	11,305	4,205	6,895	4,240	3,116
Chicago	Sub-Total	39,278	24,352	76,015	76,318	39,785	41,479	32,751	23,022
No. 7	Montana	1,543	801	2,455	3,114	2,434	3,560	2,321	780
	Idaho	1,195	679	2,168	2,662	1,791	3,098	1,856	315
	Wyoming	806	458	1,460	1,722	1,310	1,529	1,129	245
	Colorado	3,839	3,036	7,595	8,758	4,327	5,550	3,884	753
	Utah	1,632	1,363	2,973	3,734	2,393	3,532	2,291	111
	New Mexico	1,323	759	1,923	2,379	2,266	3,183	2,120	218
Denver	Sub-Total	10,338	7,096	18,574	22,369	14,521	20,452	13,601	2,422
No. 8	Washington	5,672	4,660	11,907	13,428	4,564	7,734	4,680	442
	Oregon	5,305	4,194	9,688	12,706	7,315	10,677	6,968	534
	Northern California	9,077	9,008	21,961	27,479	9,609	20,709	11,224	653
	Southern California	11,831	13,401	30,975	39,678	8,991	16,950	9,749	289
	Nevada	436	341	817	1,032	990	1,091	833	29
	Arizona	1,669	1,282	3,747	4,188	3,054	4,016	2,772	144
San Francisco	Sub-Total	33,990	32,886	79,095	98,511	34,523	61,177	36,226	2,091
No. 9	Puerto Rico	1,000	200	750	1,037	540	460	413	43
	Virgin Islands	105	20	62	116	100	100	81	29
	Canal Zone	226	49	120	230	558	200	341	11
	Alaska	125	25	25	84	175	30	97	27
Washington, D.C.	Sub-Total	1,456	294	957	1,467	1,373	790	932	110
Total U. S. and Territories		321,827	253,000	644,000	735,914	299,000	460,000	292,100	59,800

* The quotas listed do not include reserves except in the farm tractor and implement quota where the total state quotas are listed.





EUROPE

SOVIET RUSSIA

Substitute for Shellac

Pre-war Russia, with the goal of self-sufficiency before her, naturally did not neglect work on plastics, and the literature reveals much original work carried out in this field. Among the imported products it was desired to replace by equivalents produced locally from native materials was shellac. An article in a paper devoted to organic chemistry published details on the use of polyvinyl chloride combined with Novolak, shale, plasticizers, a small amount of carbon black, and pitch, to take the place of shellac in the manufacture of gramaphone records. It is said that the product thus obtained reproduced the characteristic properties of shellac in a satisfactory manner. The material was rather hard, but could readily be softened; it was glossy black in color and easy to compress.

Working Aminoplasts at Elevated Temperatures

A later issue of this paper described the results of tests in which the temperature at which Aminoplasts are compressed could be considerably raised. Temperature was increased from the usual 135-140° C. to a maximum of 195°; the compression period for temperatures ranging from 150° to 165° was 30 to 15 seconds, and for temperatures from 165° to 195°, 15 to 5 seconds. It is stated that if the necessary speed is used in taking out and putting in, output is increased 100% to 500%; while at the same time the mechanical strength is increased from 7% to 12%.

Copolymerization of Styrol and Methylmethacrylate

The same paper also gives details of investigations in which styrol and methacrylate were polymerized alone and in combination with each other. Three methods were tested; first, the substances were polymerized in a pure, that is undiluted, state (block polymerization). A small amount of the substances together with 1% benzoylsuperoxide was enclosed in a sealed ampule and polymerized at 80°. The products obtained by this method were low molecular, particularly the pure methacrylate products; the highest molecular weight, around 22,000, was found for copolymerizates with 25% styrol and 75% methacrylate. The exceedingly low molecular weight (7200) of the polymethacrylate in particular, as well as the improvement brought about by the addition of styrol, are ascribed to the relatively severe conditions of polymerization. It is explained that the rapid exothermal polymerization of the methacrylate causes considerable overheating which accelerates the reaction and results in the formation of low molecular polymers. The addition of styrol, has a two-fold effect: first it retards polymerization of the methacrylate and hence leads to the formation of long chains, and secondly it acts as a diluent, in which capacity it eventually leads to lower molecular weights again. The tests showed that when up to 25% styrol is added, the first effect predominates, but with larger proportions of styrol, the second predominates. The product obtained is a true, homogeneous copolymer and not a mixture of polystyrol and polymethacrylate.

The second method was to polymerize in diluents. This was carried out with a 10% solution of styrol, methacryl, and their combinations in pure methanol and in methanol with 30% water. The catalyst again was benzoylsuperoxide, but here the amount was 0.5% calculated on the monomers; the temperature again was 80°.

Finally polymerization in aqueous emulsions, also at 80° and with 1% benzoylsuperoxide, was tested. The emulsifiers employed were ammonium oleate, alizarin oil, and coconut oil soap. The oleate proved unsatisfactory, but good results were obtained with the other emulsifiers, especially the coconut oil soap, which was the best of all; high molecular weights were achieved as well as

good yields. As the proportion of styrol added to the methacryl was increased, a progressive decline in the molecular weight was noted. Whereas the molecular weight of pure polymethacryl (mol. concentration 0.1190, sp. viscosity 3.9) was 84,000, that of pure polystyrol (mol. concentration 0.1220, sp. viscosity 1,000) was 34,000. Copolymerizates with 25% styrol and 75% methacryl (mol. concentration 0.360, sp. viscosity 0.414) had a molecular weight of 54,000.

GREAT BRITAIN

Rilata—New Rubber Substitute

A new rubber substitute, Rilata, has been announced by Rubber Improvement, Ltd., London. Nothing as to the composition of the new material is revealed, but it is claimed to be a plastic material that can be worked on an open mill or in an internal mixer; while its properties are such that it can be used as a substitute for crude rubber and not merely as an extender. The demand for the product is said to be increasing so rapidly, although it was developed only during 1942, that the company is already faced with the necessity of expanding the plant. Present capacity is reported at 50 tons a week.

This company also produces crumb rubber, rubber compounds, fiber compounds, and it specializes in refining scorched compounds. Besides, the company reclaims rubber by the high pressure process. The shortage of crude rubber and the resultant demand for reclaim are forcing the company to increase its output so much that before long it expects to be the largest producer of thermal reclaim in the country.

New Rubber Controller

The newly appointed Controller of Rubber is Colonel Eric Gore-Brown, D.S.O., O.B.E., T.D., A.D.C. to the King. Born in 1885, he was admitted Barrister-at-Law, Inner Temple, in 1909. He served in the European War 1914-1918, with the London Regiment in which he became Lieut.-Colonel, and later was on the staff of the XVth Corps and General Headquarters in France. Returning to England after the war, he served in the Leicestershire Yeomanry, which he subsequently commanded. In the present war he was until the end of 1940 holding various appointments. Colonel Gore-Brown is deputy-chairman of the Southern Railway Co., Messrs. Glyn Mills & Co., and a director of Gallaher Ltd.

Seaweed for Waterproofing

At a meeting of the Royal Philosophical Society of Glasgow, December 16, Elsie Conway, lecturer in botany at Glasgow University, discussed the economical uses of seaweed, of which there is great abundance on the West Coast of Scotland. Prior to the outbreak of hostilities, large amounts of Japanese seaweed extract had been imported for scientific and medical purposes; to replace this, new methods had to be devised to work the local supply of seaweed, and this undertaking had been successful. Because of its gelatinous nature, carragheen is useful as an adhesive in the textile and paint trades, and it has been found possible to produce from the larger seaweeds a compound for waterproofing cloth, plastic materials, and threads of artificial silk.

New Synthetic Resin Emulsions

A series of synthetic resin emulsions and solutions intended to replace latex and rubber solutions as adhesive, binders, waterproofing and impregnating agents has been put on the market by Scott Bader & Co., Ltd., Wollaston, Northants. The new products are said to have given very satisfactory results, especially the emulsion known as Fabo G. 83, a latex-like substance, which is finding wide use as a binding material for leather waste and for treating textiles.

Notes on the British Rubber Industry

A knighthood has been conferred on Clifford Henry Figg, chairman of Thomson, Alston & Co., Ltd., London, and of the Mercantile Bank of India, Ltd. Sir Clifford Figg is also business adviser to the Secretary of State for Colonies, is on the Council of the Rubber Growers' Association, and belongs to the International Tea Committee, the International Rubber Regulation Committee, and the Council of the Ceylon Association. Besides he is director of eleven tea and rubber companies of the Far East, being chairman of several of these.

Frozen stocks of household rubber gloves are to be bought up by the Ministry of Supply at the actual prices paid plus any expenses incurred by the holders. Household-type rubber gloves weighing not more than four ounces per pair may be bought without a buying permit by those who can produce a doctor's certificate showing that they suffer from certain skin diseases and require the gloves to perform their household tasks. In such cases the customer is allowed to buy not more than three pairs of gloves on a certificate.

Avon India Rubber Co., Ltd., reports net profits of £241,621 for the year ending September 26, 1942, against £173,332 for 1940-41. However £194,000 (against £121,000) and £6,131 (against £12,611) still have to be deducted from the amount to cover taxes and war damage insurance, respectively. After providing for dividend and bonus on ordinary shares, which again came to 10%, and contribution to the company's staff insurance and pension scheme, £11,908 (against £19,101) was carried forward.

Ford Brook Mills, Ltd., has been formed to carry on the business of reclaimers of waste rubber and similar materials and to manufacture and deal in rubber, gutta percha, balata, plastics, and chemicals. The company, capitalized at £4,500, has its offices in London.

The Phoenix Rubber Co., Ltd., with capital of £20,000, has been organized as manufacturing and research chemists, chemical engineers, erectors and operators of plant for reclaiming rubber by the plasticization or other methods, and will also manufacture and deal in synthetic rubber and rubber substitutes.

Expanded Plastics, Ltd., has been formed to manufacture and deal in natural or synthetic resinous and plastic materials, rubber and rubber substitutes, and the expanded form of such materials, and also to carry on research work. Initial capital is £100.

X-Ray Welding Co., Ltd., has been registered with a capital of £2,000 and will carry on the business of welders by all processes, of metals, plastics, and other substances. The firm also is engaged in engineering and manufacturing metals and plastic goods, photographers' apparatus, etc.

W. M. Dunn & W. J. Humphreys, Ltd., capitalized at £1,000, will repair rubber boots and shoes and vulcanize by steam, water, or other process all rubber-coated or rubber goods, including industrial shipping and automobile accessories.

ITALY

Reports from Europe indicate that the Italian Government some time ago requisitioned a part of the automobile tires held by private owners. Now, it seems, the government is preparing to make a further partial requisition, and private owners have been told to keep their tires in readiness for delivery for war use.

That the European Axis partners, and especially Germany, are actively engaged in solidly establishing their interests in all branches of industry in Europe is well-known. Recent reports from various sources disclose some of their latest moves in the chemical and synthetic industries.

While German interests are scattered far and wide over the continent, Italy appears to be restricting efforts to her closest neighbors to the East, that is, Albania, Greece, Bulgaria, Hungary, Rumania, Croatia. The Italian manufacturer of chemical products, Montecatini, has acquired an interest in the Bulgarian Ammonal concern, which has been reorganized and is now known as Montecatini-Ammonal. The new firm will at first act chiefly as agent for the products of the Italian firm, but later on will enter the productive field.

Italian interests are actively exploring the petroleum possibilities of its occupied neighbors and are also much interested in developing methane sources in Italy. European press notices report that Italy has developed a new catalytic process for producing methanol from methane; it seems that 2½ pounds of methanol can be produced from one cubic meter (35.3 cubic feet, 1.6 pounds, at 32° F.) of methane. However there appears to be some doubt as to whether the process will prove practicable at present.

The Italian chemical industry is receiving considerable assistance from the government, for the country to become as self-sufficient as possible. Much progress appears to have been made especially in plastics.

SWEDEN

Sweden recently concluded a trade agreement with Germany for 1943, under which Germany is to supply, among other goods, 1,800 tons of buna, as compared with 200 tons actually delivered in 1942. It is understood that the synthetic rubber is to be used for making tires under license from the Continental Caoutchouc Co.

A new factory to manufacture "Thiokol" has been established at Alfredshem near Ornskoldsvik in Northern Sweden. Present output is 100 kilograms (about 220 pounds) daily, and it is expected that production will come to about 200 metric tons a year. This material is said to be obtained by chemical process in connection with the manufacture of wood pulp.

During 1943 at least, not much rubber can be expected from the experiments being carried out in Sweden with Russian dandelion. It was not possible to obtain more than 20 kilograms of the seed, an amount that will produce plants from which not more than 50 tons of rubber can be expected. To produce several hundred tons of rubber, as it was hoped to be able to do this year, would require at least 1000 kilograms of seed.

FRANCE

Since all of France is now virtually in the hands of the Nazis, it may be taken for granted that the establishment of a new enterprise, especially a large one, is the result of Nazi negotiation. Therefore two new chemical companies may be considered as Nazi-dominated and samples of the infiltration of Germans into local industry.

The first company, Standard-Kuhlmann, capitalized at 5,000,000 francs, will manufacture, refine, sell, and purchase chemical products. Before the war there was in Paris a concern, Etablissements Kuhlmann, known as the largest chemical company in France, which manufactured, among other goods, a variety of synthetic resins and molding powders.

The second chemical concern lately formed in France, Société Française de la Cellulose, will build factories in Southern France. It has a capital of 100,000,000 francs.

The following constitute latest efforts at collaboration between French and German rubber manufacturers.

The shortage of rubber, which became acute in 1941, forced the French rubber industry to undertake drastic curtailment of operations; some concerns, including Etablissements Hutchinson, closed their factories and did not reopen until early 1942 when the Germans, in accordance with an agreement by their government with French rubber manufacturers, began to deliver synthetic rubber. Under this agreement each of the five leading French rubber manufacturers is coupled with a German firm which supplies synthetic rubber and necessary technical information in exchange for certain advantages to be yielded by the French concerns. The latter in turn make similar arrangements with the smaller French companies, to the benefit of the Germans. The advantages include the ceding of certain financial interests as well as of finished products. Hutchinson, for example, is linked with the Semperit Gummiwerke of Vienna, to whom it has abandoned half its interests in Italy and

Spain in exchange for this rubber collaboration, and the French concern in turn will pass on rubber and information, for appropriate considerations, to the 20 smaller French firms with which it is connected.

While some reports state that the scheme is working satisfactorily, others indicate that not all the large French concerns are proving to be as fully cooperative as Hutchinson. Some of them, like Dunlop and Michelin, for instance, are said to be withholding their collaboration or at least have not gone so far as Hutchinson.

It is now also revealed that the Allied occupation of North Africa put a stop to a plan whereby the African rubber production, which a few months earlier had been put under state control, was to have been largely diverted to German manufacturers, either directly or via French factories.

IRELAND

The rubber shortage has led Ireland also to seek for a suitable substitute, and one seems in course of development now. The manager of a glue and gelatin factory at Dungarvan has patented a process of manufacturing a substitute which, it is hoped, will prove satisfactory for use in place of rubber; the raw materials required for its production are available locally.

FAR EAST

NEW ZEALAND

To aid in filling its needs of rubber goods, New Zealand will collect all old rubber and will produce reclaimed rubber in two factories with annual capacity of about 750 long tons. This reclaim, considered sufficient to meet the country's immediate requirements, is to be converted into hard rubber for portable radio sets and battery boxes, into mechanical goods, as washers for machinery and buffers, and also to make camelback. Most of these products were formerly imported from Australia.

AUSTRALIA

A part at least of Australia's requirements of crude rubber is apparently to be filled by supplies to be obtained from New Guinea and New Caledonia. New Guinea has rubber areas capable of producing about 1,500 tons a year. It is not known whether the Japanese ever succeeded in capturing these lands, but under the conditions existing not so long ago, tapping must have been almost impossible, and exporting, practically out of the question. Now that the enemy has been driven out of most of Papua, this rubber can be tapped and shipped to Australia. However even if Australia succeeded in getting all the rubber produced in New Guinea, this would cover only about one-tenth of Australia's rubber consumption.

New Caledonia, an island about 850 miles east of Queensland, has no *Hevea* trees, but, according to report, 50,000 to 100,000 banyan trees, or *Ficus prolixa*. There are two varieties, red and white; both contain rubber latex, which is more easily obtained from the red variety than from the white. Before 1914 one local merchant annually shipped 40 to 50 tons of this rubber from the red banyan to Australia, where it was used for golf balls. In the last 25 years, however, no rubber has been produced here.

but now efforts are being made to revive the industry. A government agency takes charge of rubber collection, and an attractive price has been promised. Maximum annual outputs from the red banyan are put at 150 tons, but labor shortages will probably prevent this amount from being collected in the next 12 months.

AFRICA

Results of later experiments at Natal, Union of South Africa, with *Euphorbia Tirucalli*, however,[1] indicate the possibility that sufficient rubber may be obtainable from this source, at least to ease the severe local shortage. The Dunlop Rubber Co. (South Africa), Ltd., and experts of the Union Government have conducted tests on rubber grown on Mount Edgecombe, at Natal Estates, Ltd., and it has been found that while *Euphorbia* rubber has lower tensile and higher elongation values than *Hevea*, the former can be used for a wide variety of products, including tires. However it is not planned to use this rubber alone in the manufacture of tires here.

Many millions of *Euphorbia* trees grow in vast forests between Pietermaritzburg and the Umgeni River Mouth, and it is estimated that at least 1,000 square miles in Natal and Zululand are covered by these trees. A problem hitherto has been to extract the rubber without destroying the tree; the technical staff at Edgecombe is said to have overcome the difficulty by a special patented tool.

Euphorbias also abound in other parts of the Union, and it has officially been estimated that on the native lands in the Eastern Cape Province alone there are about 60,000,000 trees.

An analysis of the latex of *E. Tirucalli* follows:

Moisture	51.29%
Rubber	8.31%
Resins	30.43%
Ash	5.96%
Impurities	4.01%

A dried sample showed 16.7% rubber and 61.2% resins.

During the rubber boom of 1911-13, five South African companies, with a total capital of 750,000, were formed to develop local sources of rubber; all were insolvent by 1913. However figures show that in that year South Africa produced 62 tons of rubber, the record for these parts. In 1926 opponents of the Stevenson Scheme backed new efforts to exploit South African rubber, but this attempt collapsed even sooner than the first.

[1] See INDIA RUBBER WORLD, Feb., 1943, p. 522.

Editor's Book Table

BOOK REVIEWS

"Without Fame. The Romance of a Profession." Otto Eisenschiml. Published by the Alliance Book Corp., 540 N. Michigan Ave., Chicago, Ill. 1942. Cloth, 9½ by 6¼ inches. 386 pages. Price $3.50.

This book, the title of which is appropriately explained as "The Romance of a Profession", is an inspiring autobiography of a man who decided at the age of thirteen in Vienna that his vocation was to be that of an industrial chemist. He came to the United States at the age of 21 to seek employment in the country of which he was a citizen by virtue of his father's status won as an officer in the United States Army during the period of the Indian fighting in the West.

As an analyst in a Pittsburgh steel mill, Dr. Eisenschiml was temporarily put in charge of the laboratory while its regular head was on leave of absence. When the regular chief chemist returned, Dr. Eisenschiml found he could not adapt himself to his old position; so he decided to go to Chicago and try other fields. His interest in people as well as science, which had provided him with many interesting experiences in Pittsburgh, stood him in good stead, and he became a chemist for a former acquaintance who was trying to develop a process and a company to produce nitric acid from the air. When this venture appeared doomed because of lack of funds to develop the process to a commercial stage, he considered abandoning chemistry for writing or selling, but finally secured a position with a linseed oil company. During many years with this company, his experiences were many and varied and included problems in employe relations, a crusade against misrepresentation of chemical products, contribution to the growth of the Chicago Section of the American Chemical Society, services to the chemical industry during the first World War, and many others which are woven into an intricate mosaic of little people and big ones, lives and incidents, businesses and philosophies, the recounting of which has earned him the titled of a raconteur.

Dr. Eisenschiml eventually went into business for himself, and the recital of his difficulties in this new role of an employer contains some pertinent comments on his education in the workings of modern business. This book is recommended reading for technical and business men.

"Plastics Catalog—1943." Published by the Plastics Catalogue Corp., 122 E. 42nd St., New York, N. Y. Cloth 9 x 12 inches. 864 pages. $5.

This year's edition of the "Plastics Catalog," the largest ever published, is indeed worthy of the supplementary classification as "An Encyclopedia of the Plastics Industries." The first section, "Plastics at War," gives details and illustrations of the applications of plastics in every arm, branch, and bureau of the government where plastics have been used. A list of government offices maintaining procurement contacts with plastics manufacturers is included. A section on synthetic rubbers, entitled, however, "Rubber-Like Plastics," contains interesting articles on all the various synthetic rubbers and includes a chart on the properties of synthetic rubbers based on data furnished by the private manufacturers of these rubbers.

The catalog contains ten sections in all, in addition to starting out with an article on the history of plastics, which is useful in providing a background picture. The section on materials covers every type of plastic molding material, filler, coloring material, plasticizer, and solvent now being commercially used. This section contains three extensive charts of special interest: (1) plastics properties chart, (2) plasticizer properties chart, and (3) solvents properties chart. Another chart, new in this edition, is on chemical formulae of plastics, resins, and synthetic rubbers. The section on plastics materials manufacture gives flow sheets of basic materials and manufacturing processes. The section on molding and fabricating is very comprehensive and includes about 30 articles on these subjects. Other sections cover molding and fabricating, machinery and equipment, laminates, plywood and vulcanized fiber, coatings, synthetic fibers, etc.

The directory section of the new catalog contains a detailed

analysis of the available equipment in plastics manufacturers' plants. A bibliography and glossary, an index of molders' marks, and a complete index of manufacturers are further important features.

NEW PUBLICATIONS

"Replacement of Thermatomic Carbons and Furnace-Type Blacks in Rubber Compounds by Decreased Loadings of Channel Blacks and Mixtures of Channel Black and Whiting." F. H. Amon and B. A. Wilkes. Godfrey L. Cabot, Inc., Boston, Mass. 30 pages. This bulletin reports the results of an investigation of combinations of a channel-process carbon black (Spheron No. 9) and Atomite whiting as possible substitutes for thermal and semi-reenforcing furnace blacks as used in compounding GR-S (Buna S) synthetic rubber. This synthetic rubber with a minimum loading of 15 to 30 parts of channel black is considered as a sufficiently strong substance for comparison with natural rubber for building up rubber compounds by adding the usual mineral fillers. The most successful results were obtained by employing mixtures of Spheron No. 9 and Atomite whiting at a loading of channel black that was about the minimum required to maintain standards for tensile, elongation, and tear resistance, and the loading of whiting that approached the amount required to maintain the proportion by volume of rubber to total pigment used in the straight furnace black loadings. Part I gives selected test results, and Part II gives detailed test results at four cures for 30, 60, and 90 parts loading of Thermax, P-33, and Gastex as well as for Spheron No. 9 at 10, 20, 30, 40, and 50 parts loading. Part III presents detailed test results at four cures for combinations of channel black and whiting, including channel black at 12, 16, 20, and 24 parts loading and whiting at six different loadings for each channel black loading. The bulletin concludes with interesting comments on possible future studies, such as the use of even harder grades of channel black instead of Spheron No. 9 in order to attempt to match more completely the physical properties of stocks compounded with furnace blacks alone.

"Rubber: List of Publications." Letter Circular LC-707. United States Department of Commerce, National Bureau of Standards, Washington, D. C. 17 pages. This bulletin gives a list of the publications by members of the staff of the National Bureau of Standards on properties, uses, and products of rubber and includes a table of contents for finding reference to publications on various subjects in the bulletin. Included also is information on specifications for rubber products, both industrial and federal.

"Unloading Inflammable Liquids." Manual Sheet TC-4. Manufacturing Chemists' Association of the United States, 608 Woodward Bldg., Washington, D. C. 12 pages. This manual sets forth detailed directions for use in unloading tank cars of inflammable products which are liquid under ordinary atmospheric conditions and should be useful for that portion of the rubber industry now involved in the manufacture of synthetic rubber in which such operations may be required. Included in the manual are directions for tank car handling when received at the plant, safety rules, details of tank car dome fittings, and instructions for sampling. Various unloading methods are described. Piping to storage tanks, pumphouse equipment, and handling of empty cars for the return to supplier are also included. Figures are given to illustrate proper unloading procedure.

"Farrel-Birmingham Equipment News." Farrel-Birmingham Co., Inc., Ansonia, Conn. 8 pages. This latest issue of the *Equipment News* describes in detail the new process-testing laboratory or pilot plant which this company has made available to manufacturers of rubber and plastics products for the development of new materials, new processes, new products, and improvement of existing ones. Recent developments in machinery such as Banbury mixers, mills, Gordon plasticators, calenders, and molding presses for processing various types of plastics are also mentioned.

"Us." United States Rubber Co., New York, N. Y. 28 pages. January, 1943. "Published by and for all the people of the United States Rubber Co." is the explanation of this monthly booklet, publication of which started August, 1942. This issue describes recent activities at the various new ordnance as well as regular plants of the company. Included is an article on F. B. Davis, Jr., chairman of the board, and on plants which had won safety awards during 1942. Material is also presented on work being done with the government agencies on *kok-saghyz* and *cryptostegia* development and some information on the rubber mission to the Soviet Union, of which W. A. Gibbons, director of development for the company, was a member.

"Thermex High-Frequency Heating." The Girdler Corp., Thermex Division, Louisville, Ky. 24 pages. This is an interesting bulletin on the industrial application of high-frequency electrostatic heating, aptly defined as taking electricity and converting it to a form that will cause the molecules in a substance to distort and rub together, thus setting up friction which results in heat. Advantages and applications of Thermex heating and how it operates are described, and reference is made to its possible use for curing thick sections of rubber and softening large masses of rubber prior to mastication.

"Thiokol Friction Compound." Technical Service Bulletin #1. Thiokol Corp., Trenton, N. J. 2 pages. The formula, mixing, and processing procedure for a "Thiokol FA" friction compound are given in this bulletin.

"Vistac." Advance Solvents & Chemical Corp., 245 Fifth Avenue, New York, N. Y. 8 pages. This bulletin gives properties and uses of Vistac, a high viscosity, tacky, stable, liquid polymer made by treating certain hydrocarbons. Excellent aging characteristics, solubility and compatibility with natural and synthetic rubbers as well as reclaimed rubber and a characteristic tackifying action are the advantages claimed for the use of this material. The discussion of the use of Vistac in latex compounding includes suggested emulsion formulas. The bulletin concludes with a description of the use of the material in the preparation of certain hot-melt and solution types of adhesives which may be made from natural rubber, reclaimed rubber, or the various synthetic rubbers as base materials.

"Bristol Automatic Control and Recording Instruments for Industrial Furnaces, Kilns, and Ovens." The Bristol Co., Waterbury, Conn. 56 pages. This publication, in the form of a binder set, contains recent bulletins covering automatic control and recording instruments for industrial furnaces, driers, kilns, and ovens. The bulletins included are well illustrated with photographs, application drawings, and wiring diagrams, and the material included gives a wide selection of types and combinations to meet the needs of manufacturer or user.

"Alert." Goodyear Tire & Rubber Co., Akron, O. 40 pages. This is the first of a series of monthly publications for the employes of Goodyear Tire and its subsidiaries. An editorial by P. W. Litchfield, chairman of the board, explains the mission of the publication and is followed by numerous illustrated articles showing the activities of members of the organization, divisions of the company, and manufacture and use of products being made by the company. Featured are the production of guns for the Army, lighter-than-air ships, an article on Mr. Litchfield and one on J. A. Merrill, the research chemist recently cited by the WPB for individual production merit, as well as many other articles on synthetic rubber and rubber products being made by the company at this time.

"Uncle Sam Wants Every Piece of Process Equipment to Do Its Bit." Brill Equipment Co., 183 Varick St., New York, N. Y. 12 pages. **"List of Inspected Gas, Oil, and Miscellaneous Appliances."** December, 1942. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 166 pages. **"Report to the 78th Congress on Lend-Lease Operations.** From the Passage of the Act, March 11, 1941, to December 31, 1942." Edward R. Stettinius, Jr. 92 pages. **"Carrier in 1942."** Carrier Corp., Syracuse, N. Y. 32 pages. **"Electric Equipment for Synthetic-Rubber Production."** General Electric Co., Schenectady, N. Y. 52 pages.

"Plastac." Advance Solvents & Chemical Corp., 245 Fifth Avenue, New York, N. Y. 2 pages. The properties and uses of Plastac as a processing aid for all butadiene copolymer types of synthetic rubbers are described in this bulletin. The material is reported to be exceptionally useful as a plasticizer and tackifier for these rubbers. Data on its use in Buna S and Buna N compounds are included.

"Low Temperature Plasticizer, 'Thiokol' TP-90." Technical Service Bulletin #6. Thiokol Corp., Trenton, N. J. 2 pages. Compound formulas, test results, and low temperature flexibility test method using "Thiokol" TP-90 in "Thiokol" Type "FA" mixes are reported. The plasticizer, a high boiling, low freezing organic liquid is said to be compatible with the butadiene copolymers.

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SOLUTION RECLAIM. H. Fuchs, *Rubber Age (N. Y.)*, Feb., 1943, pp. 397-98.

SOME OF THE "NEW" ROLES OF RUBBER IN MODERN WARFARE. R. Wolf, *Rubber Age (N. Y.)*, Feb., 1943, pp. 399-402.

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BETTER MANAGEMENT FOR THE RUBBER FACTORY. V. A. Roberts, *Rubber Age (N. Y.)*, Feb., 1943, pp. 407-409.

Patents and Trade Marks

APPLICATION

United States

2,307,735 and 2,307,736. **Tear Tape for Package Wrapper of Rubber Hydrochloride Film.** F. E. Fehr, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,307,745. **Hydrometer with Suction Bulb.** H. J. Lutz and L. Edelmann, assignors to E. Edelmann & Co., all of Chicago, Ill.

2,307,827. **Vacuum Cleaner Having Rubber Cushioning Blocks in the Motor Portion.** F. C. Doughman, Stamford, Conn., assignor to Electrolux Corp., New York, N. Y.

2,307,828. **Packed Joint with Rubber Sealing Gasket.** R. S. Eggleston, Watertown, N. Y., assignor to New York Air Brake Co., a corporation of N. J.

2,307,985. **Container for Heat-Bonding Multi-Ply Structures, Provided with a Rubbery Cover.** R. L. Beasecker, Grand Rapids, Mich.

2,308,073. **Boot for Universal Joints, Having a Bellows Portion Composed of Rubber-Like Material.** J. W. Hagerty, Detroit, assignor to Universal Products Co., Inc., Dearborn, Mich.

2,308,121. **Knitted Fabric Incorporating an Elastic Yarn.** E. St. Pierre and N. H. Smith, both of Pawtucket, assignors to Hemphill Co., Central Falls, both in R. I.

2,308,126. **Sealing Gasket Utilized in Vacuum Packing.** H. E. Stover and L. A. Von Till, both of Long Island City, N. Y., assignors to Anchor Hocking Glass Corp., Lancaster, O.

2,308,147. **Rubber Protector for Drill Pipes.** J. C. Ballagh, assignor to Patterson-Ballagh Corp., both of Los Angeles, Calif.

2,308,149. **Resilient Packing Gland.** A. E. Bingham, assignor to Dowty Equipment, Ltd., both of Cheltenham, England.

2,308,197. **Tear Tape for Package Wrapper of Rubber Hydrochloride Film.** M. S. Meyer, Wellington, New Zealand, assignor to Wingfoot Corp., Wilmington, Del.

2,308,268. **Expansible Core Comprising an Elongate Hollow Rubber Structure Reenforced by Strip Material of Intertwined Wires.** W. G. Corson, Akron, O.

2,308,286. **Soft Rubber Cap Member as Tail Joint Cover for Electrical Conductors.** E. F. Joyce, Kansas City, Kans.

2,308,310. **Filter Bag Attaching Means for Dust Arresting Apparatus, with Rubber Tubular Sealing Member.** R. Ruemelin, Jr., and O. H. Harris, assignors to R. Ruemelin, all of Milwaukee, Wis.

2,308,316. **Rubber Bearing Sleeve on Drill Pipe Protector Assembly.** W. G. L. Smith, Los Angeles, and A. M. Graham, Beverly Hills, both in Calif.; Graham assignor to Smith.

2,308,367. **Rubber Covered Cylinder in Threshing Machine, Subject to Wearing Parallel to the Surface of the Threshing Element.** A. E. W. Johnson, Chicago, Ill., assignor to International Harvester Co., a corporation of N. J.

2,308,429. **Improving Wear-Resistance of a Suede-Like Fabric by Applying an Enamel Having a Base of Ethyl Cellulose, Cellulose Acetate, or Copolymer of Vinyl Acetate and Vinyl Chloride.** R. G. Smith and W. J. Physioc, Jr., both of Stamford, Conn., assignors to Atlas Powder Co., Wilmington, Del.

2,308,452. **Portable Shower Bath Having a Flexible Suction Pipe.** J. Ortyl, Detroit, Mich.

2,308,467. **Tire Tread Having Circumferential Ribs with Spaced Pairs of Slits Defining Alternate Buttons and Webs in the Ribs, the Webs Having Greater Flexing and Wiping Action Than the Buttons.** F. Kovacs, Akron, assignor to Seiberling Rubber Co., Barberton, both in O.

2,308,480. **Container for Projectile Fuses, Having Resilient Gaskets.** S. C. Abbott and A. G. Fletcher, both of Acton, London, England.

2,308,484. **Catheter.** J. M. Auzin and M. M. Zinck, both of Warwick, R. I., assignors to Davol Rubber Co., a corporation of R. I.

2,308,529. **Resilient Insert-Insole Combination.** M. Margolin, Elgin, Ill.

2,308,530. **Coating for a Metal Food Container, Comprising a Mixture of Waxes, Resins, and Rubber.** C. E. McManus, Spring Lake, N. J., assignor to Crown Cork & Seal Co., Inc., Baltimore, Md.

2,308,593. **Knitted Goods Composed of at Least One Potentially Adhesive Filament and a Non-Adhesive Filament Twisted Together; and Wherein, after Knitting, the Goods Are Subjected to a Treatment Which Produces the Adhesive State in the Potentially Adhesive Filament Such as to Bring about Union between That Filament and Itself Only, at Points Where It Crosses Itself in Contact.** H. E. Brew, Glazebrook, Manchester, England.

2,308,724. **Article Composed of Superimposed Dipped Layers of Natural Rubber and Synthetic Rubber Bonded Together, and Having the Elasticity and Tearing Resistance of a Similar Article of Wearing Apparel Made Entirely of Natural Rubber, but Superior Resistance to Sunlight, Air, and Solvents as Compared with Natural Rubber.** P. Stamberger, assignor to International Latex Corp., both of Dover, Del.

2,308,952. **Rubber Valve Stem for Pneumatic Tractor Tire Inner Tubes Adapted to Contain a Corrosive Antifreeze Fluid.** H. C. Ickes, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,954. **Braking Mechanism Containing a Pneumatically Inflatable Element Disposed within the Chamber between Brake Shoes and Inner Chamber Wall.** J. W. Hatch, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,955. **Rubber Tubular Valve for Inner Chamber of Dual-Chambered Inner Tube.** R. F. Wilson and J. W. Liska, assignors to Firestone Tire & Rubber Co., all of Akron, O.

2,308,956. **Floating-Type Hydraulic Piston with Resilient Sealing Member.** J. W. Hatch, assignor to Firestone Tire & Rubber Co., Akron, O.

2,308,962. **Motor Mounting Utilizing Rubber Cushioning Members.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,964. **Cellular Rubber Cushion Seat.** C. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,965. **Rubber Bushing Bonded to Metal Sleeve.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,966. **Friction Device Having a Friction Sleeve Composed of a Resilient Layer and a Lubricant-Impregnated Fibrous Layer.** C. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,967. **Rubber Bushing Adapted for Pivotal Connections.** R. L. Kuss, Cuyahoga Falls, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,308,969. **Resilient Mounting.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,975. **Flexible Electric Conductor Comprising a Core of Conductive Material, an Insulating Coating around the Core and Comprising Chlorinated Rubber and a Water-Resistant Softening Agent, and a Coating upon the First Coating Containing a Softening Agent and a Substance Consisting of Cellulose Ethers or Cellulose Esters.** J. Hoekstra and J. E. H. Rieter, both of Eindhoven, Netherlands; vested in the Alien Property Custodian.

2,309,001. **Refrigerator Cabinet Having a Resilient Sealing Gasket.** A. E. Nave, Newburth, and W. A. Kuenzli, Evansville, both of Ind., assignors to Servel, Inc., New York, N. Y.

2,309,061. **Tire Tube Inflation Valve Having a Yieldable Frusto-Conical Pad for Attachment to the Wall of the Tube.** W. F. Goff, Akron, assignor to Ohio Injector Co., Wadsworth, both in O.

2,309,157. **Rotary Ground-Working Machine Having U-Shaped Ground-Engaging Tines Resiliently Cushioned.** M. S. Ariens, Brillion, Wis.

2,309,184. **Typewriter Attachment of Sponge-Rubber-Like Material for the Spacer Bar.** E. D. Goodell, New York, N. Y.

2,309,253. **Pipe Fitting with Resilient Gasket.** F. T. Newell, assignor to Dresser Mfg. Co., both of Bradford, Pa.

2,309,347. **Food Mixer with Cup-Like Resilient Loose Support for a Removable Bowl.** M. J. Landgraf, assignor to H. J. Goldblatt, both of Chicago, Ill.

2,309,374. **Steering Wheel Cover with Elastic Drawing Means.** S. Alexander, Hartford, Conn.

2,309,399. **Gas-Tight Garment Storage Vault Utilizing Rubber Molding.** W. R. Kohl, Glenview, Ill.

2,309,429. **Expansible Collapsing Plug Apparatus for Use in a Urinal Trap.** E. T. Ahern, New Haven, Conn.

2,309,430. **Rubber-Bodied Valve Stem.** A. D. Albert, Fairfield, assignor to Bridgeport Brass Co., Bridgeport, both in Conn.

2,309,438. **Seat Cushion Comprising a Sponge Rubber Pad Positioned on Coiled Springs.** H. C. Borisch, Milwaukee, assignor to Nash-Kelvinator Corp., Kenosha, both in Wis.

2,309,446. **Piston Member with a Single Packing Ring of Flexible Rubber-Like Material.** E. D. Ekkebus, Mt. Prospect, assignor to Chicago Belting Co., Chicago, both in Ill.

2,309,456. **Abrasive Tool Comprising a Hollow Core of Two Oppositely Wound, Helical Rubber Strips and a Cover of Helically Wound Flexible Abrasive Strip.** W. S. Hoskin, Highland Park, and F. B. Wolfschlager, Holly, assignors to Mid-West Abrasive Co., Detroit, all in Mich.

2,309,459. **Abdominal Supporter.** J. J. Kispert, assignor to Kellogg Corset Co., both of Jackson, Mich.

2,309,466. **Propeller Blade Fairing Having Two Bands of Resilient Material Surrounding a Portion of the Blade.** E. Martin, West Hartford, assignor to United Aircraft Corp., East Hartford, both in Conn.

2,309,501. **Foundation Garment with Automatic Laced Inner Belt.** F. A. Cohen, New York, N. Y.

2,309,516. **Golf Glove with Fourchettes of Rubberized Elastic Material Connecting the Finger Ball Portions.** E. C. Lindfelt, Des Moines, Iowa.

2,309,570. **Automobile Seat Cushion with Pad of Sponge Rubber over Coiled Springs.** H. C. Borisch, Milwaukee, assignor to Nash-Kelvinator Corp., Kenosha, both in Wis.

2,309,685. **Corrugated Drain Pipe Having Plastic Material Covering the Lining of Corrugated Sheet Material.** E. L. Westwood, assignor to Wheeling Steel Corp., Wheeling, W. Va.

2,309,697. **Well Cleaning Device Having Soft Elastic Rings Separating Perforated Disks and Adapted to Come into Sealing Contact with a Well Screen.** N. E. Gunderson, assignor to Layne-Northern Co., Inc., Mishawaka, Ind.

2,309,783. **Resilient Cleat for Athletic Footwear.** T. S. Park, Houston, Tex.

2,309,786. **Cleaning Machine with Rubber Grommet Surrounding a Removable Nozzle.** H. C. Porter, assignor to Bendix Home Appliances, Inc., both of South Bend, Ind.

2,309,819. **Glass Polishing and Grinding Apparatus Having a Fibrous Pad with an Elastomer Bond.** R. C. Benner, assignor to Carborundum Co., both of Niagara Falls, N. Y.

2,309,839. **Rubber Bodied Float Collar for Well Pipe.** J. R. Gardner, Houston, Tex.

2,309,868. **Catamenial Sac.** I. W. Robertson, Los Angeles, Calif.

2,309,928. **Flat Convevor Belt Comprising Layers of Duck Bonded Together with Vulcanized Rubber, the Bottom Layer Having Bare Bottom Marginal Surfaces and a Rubber Cover Extending between the Margins and Bonded to the Duck.** T. A. Bennett, assignor to United States Rubber Co., both of New York, N. Y.

2,310,006. **Fountain Cleaning Device Having an Applicator of Thick Sponge.** J. A. Wisner, Baltimore, Md.

2,310,070. **Incorporating Elastic Yarn in a Fabric.** O. Fregeolle, assignor to Hemphill Co., both Central Falls, R. I.

2,310,250. **High-Pressure Hose Coupling Having Rubber Walls.** W. A. Melsom, Willesden Junction, assignor to Bowden (Engineers), Ltd., London, both in England.

2,310,292. **Gummed Body Protected from Humidity by a Thin Layer of Polyvinyl Alcohol Readily Dissolved upon the Application of Water.** F. W. Humphner, Oak Park, assignor to Mid-States Gummed Paper Co., Chicago, both in Ill.

2,310,309. **Rotary Fluid Controlling Device and Seal for a Shaft.** G. H. Orr, assignor to General Tire & Rubber Co., both of Akron, O.

2,310,351. **Rubber-Bodied Stopper for Pipes.** W. J. Bowan and E. H. Fawley, assignors to Mueller Co., all of Decatur, Ill.

2,310,355. **Milk-Bottle Cream Separator with Resilient Disk.** R. O. Eastin, Mountain Grove, Mo.

2,310,378 and 2,310,379. **Lather Mixing Machine with Resilient Porous Soap-Engaging Material.** L. J. Wahl, assignor to Wahl Clipper Corp., both of Sterling, Ill.

2,310,405. **Synthetic Rubber Sealing Material for Fluid Sealing a Space between Relatively Movable Members.** H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Summit, O.

2,310,423. **Means to Prevent Leakage of Fluid through Electric Cables, Utilizing a Rubber Sleeve Vulcanized to a Bared Surface of a Conductor.** R. Gold, Birmingham, England.

2,310,467. **Anti-Skid Tire Appliance.** E. P. Schwab, Pittsburgh, Pa.

2,310,486. **Resilient Car Wheel with Rubber Means Acting in Shear.** T. Zintsmaster, Cleveland Heights, assignor to National Malleable & Steel Castings Co., Cleveland, both in O.

2,310,505. **Urinal Bag.** L. I. Blackburn and L. De Cordova, both of Los Angeles, Calif.

2,310,536. **Flexible Hose Coupling Utilizing a Flexible Sleeve.** W. A. Melsom, Willesden Junction, assignor to Bowden (Engineers), Ltd., both of London, England.

2,310,554. **Suction Nozzle with Elastic Body.** A. W. Seyfried, Racine, Wis., assignor to Scovill Mfg. Co., Waterbury, Conn.

2,310,564. **Pessary.** E. L. Younkins, South Nyack, N. Y.

2,310,607. **Rubber Bonded Split Metal Washer Seal.** D. E. Batesole, Glenbrook, assignor to Norma-Hoffmann Bearing Corp., Stamford, Conn.

2,310,622. **Conduit Fastener Clip.** H. R. Ellinwood, Hollywood, Calif., assignor to Adel Precision Products Corp., a corporation of Calif.

2,310,683. **Resilient Bushings for Roller Skates.** J. T. Enley, Riverside, N. J., assignor to Metal Craft Mfg. Co., a corporation of N. J.

2,310,751. **Windshield Wiper.** A. C. Scinta, assignor to Trico Products Corp., both of Buffalo, N. Y.

2,310,776. Tire Having Cord Layers in Diagonal Arrangement so That Torsional Forces Transmitted between Tread and Rim through the Body Exert Less Tension on the Cords of Two Layers at the Inner Face When the Tire Is Driven in the Direction of Convergence of the Cords Than When It Is Driven in the Opposite Direction. V. B. Gay, Clinton, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,310,819. Conveyor Belt of Stretch-Resisting Material and a Wear-Resisting Rubber Cover Vulcanized thereto. P. W. Van Orden, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,310,824. Orthopedic Foot Pad Having a Flat Bottomed Spongiform Structure. F. E. Wyant, Anderson, Ind.
2,310,842. Curtain Tieback Holder Utilizing a Suction Cup. M. M. M. Davitt and J. E. M. Wendell, both of Rensselaer, N. Y.
2,310,855. Slip with Elastic Fabric Panel. R. Manson, N. Y.

Dominion of Canada

409,717. Suspensory. A. Baehler, Youngstown, O., U. S. A.
409,721. Storage Battery Non-Spill Vent Plug. H. A. Cohen, Kingston, Ont.
409,731. Syphonic Milk Skimmer with Expandable Cupped Piston. A. D. MacArthur, Calgary, Alta.
409,732. Hollow Vacuum Bottle Closure. N. F. McQuatt, Timmins, Ont.
409,739. Flexible Sectional Lighting Unit for Airports, Having Top and Bottom Portions of Rubber Molded about the Terminals. A. Pardee, Pasadena, Calif., U. S. A.
409,762. Feeding Pail for Suckling Animals, Having a Flexible Nipple on the Lower Portion. Armour & Co., Chicago, Ill., assignee of J. M. Coyner, Madison, Wis., both in the U. S. A.
409,786. Elastic Fabric. David Clark Co., Inc., assignee of D. M. Clark, both of Worcester, Mass., U. S. A.
409,816. Ball-Shaped Surgical Dressing Encased in Gauze and Sealed with Latex Adhesive. Johnson & Johnson, Ltd., Montreal, P. Q., assignee of R. L. Wells, Stelton, N. J., U. S. A.
409,827. Container Closure of Fibrous Material Coated with a Tough, Elastic, Gas-Tight Material. Oswego Falls Corp., assignee of I. L. Wilcox, both of Fulton, N. Y., U. S. A.
409,882. Elastic-Gored Shoe. G. M. Herrimann, Ridgewood, N. J., U. S. A.
409,953. Tire Tread Comprising a Plurality of Ribs and Grooves: the Ribs Provided with Slits Extending Radially of the Ribs. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. G. Havens, Detroit, Mich., U. S. A.
409,970. Footwear of the Leg and Foot Type, Having a Flexible Lacing Stay Structure. B. F. Goodrich Co., New York, N. Y., assignee of F. H. Martin, Belmont, Mass., U. S. A.
410,029. Aircraft Engine Cowl Support with Damped Resilient Bracket Members. United Aircraft Corp., East Hartford, assignee of J. M. Tyler, West Hartford, both in Conn., U. S. A.
410,034. Rubber Blanket for Supporting a Sole in a Shoe Sole Shaping Machine. United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of F. V. Hart, Lynn, Mass., U. S. A.
410,173. Shoe Insole and Rubber-Like Pad. M. Margolin, Elgin, Ill., U. S. A.
410,258. Resilient Joint. Lord Mfg. Co., assignee of H. C. Lord, Erie, Pa., U. S. A.

United Kingdom

548,843. Airplane Deicer. B. F. Goodrich Co.
548,914. Tires. Seiberling Rubber Co.
549,954. Process for Electrodepositing Iron and Electrolyte therefor. United States Rubber Co.
549,995. Flexible Adhesive Material. Johnson & Johnson (Gt. Britain), Ltd.
550,010. Teat Cups for Mechanical Milking Equipment. Alfa-Laval Co., Ltd., and T. L. Clark.
550,073. Rubber-Coated Textile Fabrics. Latex Industries, Ltd., and L. Landau.
550,095. Rubber Curbs. H. J. Haynes.
550,101. Aircraft Landing-Gear. Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.
550,187. Breast Pumps. E. J. Gavatin and E. G. Nycander.
550,232. Pressure-Sensitive Adhesives. Johnson & Johnson (Gt. Britain), Ltd.
550,339. Frictional Torque Transmitting Device. General Tire & Rubber Co.

PROCESS

United States

2,308,305. Laminated Fabric Comprising a Sheet of Fabric Coated with a Composition of Finely Divided Graphite and a Liquid Vehicle Which Remains Fluid as Long as It Remains on the Fabric and Is Harmless to Rubber, and a Body of Moldable Rubber Composition Press Molded to the Other Surface of the Fabric. M. W. Reynolds, assignor by mesne assignments, to Acheson Colloids Corp., both of Port Huron, Mich.
2,308,586. Rubber Coated Footwear. R. V. Carberry, Douglaston, assignor to J. C. Penney Co., New York, both in N. Y.
2,308,951. Continuous Manufacture of Rubber Sheeting by Distributing Latex over a Moving Surface, Gelling the Latex to Rubber, Immersing the Moving Surface in a Body of Water to Float the Rubber Strip, and Associating It with Heat to Vulcanize It. C. K. Novotny and G. P. Bosomworth, assignors to Firestone Tire & Rubber Co., both of Akron, O.
2,308,958. Forming an Aqueous Dispersion of Rubber by Forcing Water in the Rubber through Heating the Rubber with Steam at about 300° F., Mixing a Casein Paste with the Water-Impregnated Rubber to Form a Uniform Mixture with Rubber Being the Continuous Phase, Continuing Mastication and Adding Water until Water Is the Continuous Phase in Which the Casein and Rubber Are Dispersed. H. R. Williams, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,308,970. Vulcanizing Cellular Rubber Made from Latex. M. Carter, Yardley, Pa., assignor to Firestone Tire & Rubber Co., Akron, O.
2,309,005. Making Sponge Rubber by Converting Latex into a Foam and Reducing the Latter's Temperature to within the Range -60° C. to -18° C. and Sufficiently to Coagulate Irreversibly the Latex in the Foam. S. R. Ogilby, Staten Island, assignor to United States Rubber Co., New York, both in N. Y.
2,309,042. Treading Tires by Forming a Slab of Unvulcanized Rubber-Like Material, Pressing the Slab to Form an Embossed Design on the Tread Face, Adhering It to the Tread Surface of a Tire, and Vulcanizing with Tread Surface Exposed Directly to Heated Pressure Fluid. T. E. Boyle, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,309,108. Waterproof Abrasive Block Made by Encasing Particles in a Synthetic Resin, Mixing the Prepared Particles with a Solution of Rubber and a Synthetic Resin and Forming the Mass into a Flexible Article. L. A. Hatch, assignor to Minnesota Mining & Manufacturing Co., both of St. Paul, Minn.
2,309,865. Adhesively Applying Covering Material to an Inflated Athletic Ball. M. B. Reach, Springfield, Mass.
2,310,619. Producing a Compressed, Cured Rubber Sheet by Pressing a Rubber Stock against a Smooth Metallic Member with a Sheet of Cellulosic Material Between Rubber and Metal, and Curing the Rubber While so Pressed under Heat. E. R. Dillehay, Glen Ellyn, Ill., assignor to Richardson Co., Lockland, O.

Dominion of Canada

409,869. Rubber Plates in Multi-Color Printing Press, with Indexing Means. J. F. Hawley, Riverside, Ill., U. S. A.
409,916 and 409,917. Attaching an Outsole to a Shoe Upper Having an Overlasted Marginal Portion Composed of Vinyl Resin, by Securing thereto a Film of Chlorinated Rubber and Securing an Outsole to This Marginal Portion by Means of Polymerized Chloroprene. B. B. Chemical Co. of Canada, Ltd., Montreal, P. Q., assignee of F. V. Nugent, Abington, Mass., U. S. A.
410,059. Forming a Scalp-Treating Helmet. E. E. Oestrike, Detroit, Mich., U. S. A.
410,425. Making a Dress Form from a Human Model. Singer Mfg. Co., Elizabeth, assignee of R. F. Palmer, Montclair, both in N. J., and K. C. Selby, White Plains, N. Y., both in the U. S. A.

MACHINERY

United States

2,308,040. Quick Change Calender Roll. H. A. Anderson, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.
2,308,602. Tire Bead Aliner in Retreading of Tires. E. A. Glynn, assignor to Super Mold Corp. of Calif., both of Lodi, Calif.
2,308,636. Apparatus for Injection Molding Vinyl Resins. W. R. Wheeler, Lakewood, O., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.
2,308,649. Apparatus and Method to Produce Dress-Shield Inner Liners. W. J. Dean, North Kansas City, Mo.
2,308,948. Vulcanizer. G. P. Bosomworth, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,308,949. Apparatus for Producing Continuous Rubber Threads, Strips, Tubes, Etc. S. W. Alderfer, Fairlawn, O., assignor to Firestone Tire & Rubber Co., Akron, both in O.
2,308,950. Tire Balancer. R. D. Hulslander, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,308,957. Tire Shaping Apparatus and Method. R. W. Allen, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,308,968. Apparatus and Method to Crimp Spark Plugs. D. W. Gregory, Trenton, Mich., assignor to Firestone Tire & Rubber Co., Akron, O.
2,308,971. Mold Filling Device. M. Carter, Yardley, Pa., assignor to Firestone Tire & Rubber Co., Akron, O.
2,308,972. Guide Plate Apparatus. C. J. Hasson, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,308,977. Vulcanizing Press. C. Iverson and W. A. Magerkurth, assignors to National Rubber Machinery Co., all of Akron, O.
2,309,294. Former for a Pezzer Head Catheter. J. M. Auzin, Warwick, R. I., assignor to Davol Rubber Co., a corporation of R. I.
2,309,590. Apparatus to Remove Curing Bags from Tires. F. I. Honderich, Natchez, Miss., assignor by mesne assignments, to United States Rubber Co., New York, N. Y.
2,309,755. Apparatus for Handling Strip Material. E. A. Davis, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,309,981. Apparatus or Liquid Coating Sheet Material. C. J. Randall, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.
2,310,362. Indestructible Form for Producing Inflatable Seamless Tubular Articles. R. R. Frissell, assignor to Barr Rubber Products Co., both of Sandusky, O.
2,310,404. Apparatus to Produce Spherical Articles. H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Summit, O.
2,310,642. Continuous Vulcanizing Machine. G. D. Marcy, Newton Highlands, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.
2,310,674. Tire Vulcanizing Toggle Press. H. C. Bostwick, assignor to Akron Standard Mold Co., both of Akron, O.
2,310,830. Molding Apparatus for Open-Type Cushions. G. W. Blair and J. F. Schott, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.
2,310,851. Apparatus to Make Laminated Strips. U. C. Haren, Akron, and J. P. Sapp, Kent, both in O., assignors to B. F. Goodrich Co., New York, N. Y.
2,310,891. Tire Spreader. C. E. Branick, Fargo, N. Dak.

United Kingdom

549,990. Method of Forming Tire Molds. Wingfoot Corp.
550,014. Tools for and Processes of Blanking and Forming Metal and Other Materials. British Tyre & Rubber Co., Ltd., and W. N. Evans.
550,181. Vulcanizers. A. E. Lake.

CHEMICAL

United States

2,307,801. Product Comprising a Metal Base Having a Thin Coating of Cuprous Metal Adherent to Vulcanized Rubber, a Thin Coating of Resin Adhering to the Base, and a Coating of Unvulcanized Rubber Adherent to the Metal after Vulcanization over the Resin. R. C. Pierce, Niles, Mich., assignor to National-Standard Co., a corporation of Mich.
2,307,861. Coated Article Comprising a Metal Base, a Primer Coat (Mixture of Fatty Acid Glyceride and Nitric Acid) Baked until the Surface is Non-Adherent, and a Coating of a Vinyl Acetate-Vinyl Chloride Copolymer. C. L. Shapiro, New York, N. Y., assignor, by mesne assignments, to Atlas Powder Co., Wilmington, Del.
2,307,876. Glazed Chintz Fabric Having a First Coating of an Artificial Rubber-Like Polymer of an Acrylic Ester Derivative and a Superimposed Second Coating Containing a Urea-Formaldehyde Resin, an Alkyd Resin, and a Plasticizer. H. Corteen, assignor to Tootal Broadhurst Lee Co., Ltd., both of Manchester, England.
2,307,962. Transparent Sheeting Comprising Layers of Organic Acid Esters of Cellulose, Heat and Pressure Sensitive Vinyl Resin, and Chlorinated Rubber Binder. P. C. Seel, assignor to Eastman Kodak Co., both of Rochester, N. Y.
2,308,186. Manufacture of Transparent Rubber Hydrochloride Film by Heating a Rubber Hydrochloride Cement Dissolved in a Benzene Solvent

until the Cement Is Homogenized. G. R. Lyon, St. Mary's, O., assignor to Wingfoot Corp., Wilmington, Del.

2,308,229. **Manufacture of Styrene Comprising Dehydrogenating Ethylbenzene with Formation of a Mixture of Azeotropes of Ethylbenzene and Styrene, Rectifying with Water to Maintain a Control Temperature at Which the Azeotropes Will Separate.** G. Natta, Milan, Italy; vested in the Alien Property Custodian.

2,308,282. **Corrosion Inhibitor Comprising a Mineral Oil and a Dibenzylamine Compound.** L. H. Howland, Cheshire, Conn., and W. P. ter Horst, Packanack Lake, N. J., assignors to United States Rubber Co., New York, N. Y.

2,308,342. **Flexible Self-Sealing Pipe for Gasoline or Oil.** B. Wilkinson, London, and W. D. Douglas, Farnborough, both in England; Wilkinson assignor to Wilkinson Process Rubber Co. Ltd., Kuala Lumpur Selangor, Federated Malay States.

2,308,879. **Water Paint Containing Congo Gum Dispersed in an Alkaline Solution, Glue, Urea, Casein, and Latex.** E. Hirsch, Vienna, Austria, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,309,023. **Shoe Stiffener Comprising a Fabric Impregnated with a Water Free Thermoplastic Compound Including Rubber, Wax, Colophony, and Coumarone Indene Resin.** A. P. Swett, Westwood, Mass., assignor to Beckwith Mfg. Co., Dover, N. H.

2,309,185. **Waterproof Sealing Compound Comprising a Mixture of Calcium Sulphate and Portland Cement with a Binding Agent (Chlorinated Rubber Plasticized with Chlorinated Diphenyl).** P. L. Gordon, New York, N. Y.

2,309,370. **Heat Treatment of Vinylidene Chloride Polymers.** J. L. Williams, assignor to Dow Chemical Co., both of Midland, Mich.

2,309,768. **Production of Polyethines Which Comprises Heating a Compound Having the Vinyl Group Attached through Oxygen to the Remainder of the Molecule, the Polymer Consisting of Esters, Acetals, or Ethers of Polyvinyl Alcohol, the Heating Being at a Temperature at Least about 250° C., Such That the Hydroxyl Compound Forming the Vinyl Polymer in Combination with the Hydrocarbon Polymer Is Split off, Removing the Liberated Hydroxyl Compound and Stopping the Reaction before the Hydrocarbon Polymer Is Substantially Attacked.** W. O. Herrmann, Deisenhofen, Upper Bavaria, and W. Haehnel and H. Deutsch, both of Munich, both in Germany; vested in the Alien Property Custodian.

2,309,932. **Rubber Hydrochloride Composition Containing an N,N'-Diaryl Piperazine Sufficient to Retard the Photochemical Disintegration of the Rubber Hydrochloride.** J. P. Chittum and G. E. Hulse, both of Passaic, N. J., assignors to United States Rubber Co., New York, N. Y.

2,310,132. **Material Suitable for Making Artificial Dentures Comprising a Mixed-Polymerization Product Formed from Vinyl Chloride and Acrylic Acid and Monomeric Methyl Methacrylate.** L. Underdahl, Portland, Ore.

2,310,449. **Age Resisting Rubbery Material Having Incorporated therein a Small Amount of a Metallic Salt of an Alcohol, Mercaptan, Phenol, or Thiophenol.** I. E. Lightbown and J. G. McNab, both of Roselle, N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,310,676. **Lacquer Coated Vulcanized Rubber Product Having Incorporated therein a Quantity of Sulphur and at Least One Vulcanization Accelerator Which Act to Counteract Retardation of the Rubber Cure by the Lacquer When at Vulcanization Temperatures.** P. L. Bush and D. E. Lovell, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

2,310,762. **Production of Styrene by Subjecting a Carboxylic Acid Ester of Phenylethyl Alcohol to a Temperature of from about 500° C. to about 700° C.** G. Daumiller and G. Hoffmann, both of Ludwigshafen-on-the-Rhine, Germany; vested in the Alien Property Custodian.

2,310,780. **Vinyl Esters of Tertiary Carboxylic Acids.** W. E. Hanford and W. E. Mochel, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,310,889. **Vinyl Chloride-Acetate Copolymer in Combination with a Thermosetting Phenolaldehyde Resin, Methyl Methacrylate Resin, and a Plasticizer to Form a Composition Suitable for Use in Raincoats, Gloves, Etc.** L. Becker, assignor to S. Buchsbaum & Co., both of Chicago, Ill.

Dominion of Canada

409,922. **Wrapping Sheet Comprising a Transparent Sheet of Rubber Bonded to a Cellulosic Material by an Adhesive Coating Comprising a Resin, Unvulcanized Rubber, and a Mineral Wax.** Canada Foils, Ltd., assignee of C. P. Olstad, both of Toronto, Ont.

409,991. **Coating Films of Rubber Hydrochloride with a Hot Melt Composition of Wax and Rubber.** Marathon Paper Mills Co., Rothschild, assignee of A. Abrams, G. W. Forcey, both of Wausau, and C. L. Wagner, Menasha, co-inventors, all in Wis., U. S. A.

410,015. **Preparing Spreadable Coating Compositions for Electric Conductors,** by Dissolving a Minor Portion of a High Molecular Weight, Non-Volatile Substance (Paraffin Wax, Petrolatum, Viscous Hydrocarbon Oils, or Plastic Linear Hydrocarbon Polymers) in a Major Proportion of a Volatile Solvent Capable of Swelling a Solid Colloidal Rubbery Material, Swelling the Rubber Material to a Jelly-Like Mass While Retaining Its Aggregate Colloidal Structure, and Maintaining the Volatile Solvent Absorbed in the Jelly-Like Mass to Make the Mass Smoothly Spreadable. Standard Oil Development Co., Lindon, assignee of W. H. Smyers, Westfield, both in N. J., U. S. A.

410,373. **Process of Stapling and Crimping Synthetic Textile Fibers of Vinyl Resins Resulting from the Conjoint Polymerization of Vinyl Chloride and Vinyl Acetate.** Carbide & Carbon Chemicals Ltd., Toronto, Ont., assignee of E. W. Rugeley, Charleston, W. Va., U. S. A.

410,374. **Process of Making Composite Textile Materials from Vinyl Resins Resulting from the Conjoint Polymerization of Vinyl Chloride with Vinyl Acetate.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of T. F. Carruthers, South Charleston, and W. N. Stoops, Charleston, co-inventors, both in W. Va., U. S. A.

410,382. **Wax-Like Composition for Coating Papers Containing a Large Percentage of Paraffin Wax, an Unemulsified Heavy Mineral Oil, and a Low Percentage of an Unmilled Thermoplastic Resinous Powder Prepared by Treating Rubber with a Halide of an Amphoteric Metal.** Dixie Wax Paper Co., Dallas, Tex., assignee of W. H. Bryce, Memphis, Tenn., both in the U. S. A.

410,417. **Rubber Hydrohalide Containing Approximately 26 to 33% of Halogen, Being in the Form of Spongy Granules, and Having Been Precipitated from a Solution of Rubber in a Solvent therefor in Which the Precipitated Rubber Hydrohalide Is Insoluble.** Reynolds Research Corp., New York, N. Y., assignee of E. H. Morse, Nutley, N. J., W. S. Johnston, New York, and E. L. Mack, Douglaston, both in N. Y., co-inventors, both in the U. S. A.

United Kingdom

549,930. **Manufacture and Use of Hydrocarbons Derived from Styrene and Its Homologs.** D. C. Quin and A. Boake, Roberts & Co., Ltd.

550,280. **Rubber-Like Materials.** E. I. du Pont de Nemours & Co., Inc.

UNCLASSIFIED

United States

2,307,884. **Tool for Applying Elastic Annular Cushions at Junction Points of Plugs and Cords.** H. A. Greenwood, Chicago, Ill., assignor to American Telephone & Telegraph Co., a corporation of N. Y.

2,308,177. **Advertising Display Container.** L. H. Jones, Chicago, Ill., assignor to Wingfoot Corp., Wilmington, Del.

2,308,372. **Automatic Tire Pressure Gage or Signal.** C. A. Krantz, Chicago, Ill.

2,308,953. **Apparatus for Punching and Working Metal.** A. M. Brown, Trenton, Mich., assignor to Firestone Tire & Rubber Co., Akron, O.

2,308,959. **Wheel Construction for Mounting a Pneumatic Tire.** W. S. Brink, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,961. **Braking Mechanism.** J. W. Tatter, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,308,963. **Cam Mechanism.** R. C. Davis, Akron, and C. W. Graham, Cleveland, assignors to Firestone Tire & Rubber Co., Akron, both in O.

2,309,025. **Tire Pressure Indicator.** C. O. Thorson, assignor to J. L. Rich, both of Los Altos, Calif.

2,309,564. **Tire Cord.** J. Anderson, Sutton Coldfield, and M. Langstreth, Rochdale, both in England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,310,400. **Face Liner for Concrete Forms Comprising Wood Pulp Air-Permeable Sheets Flexible to Lie Smoothly and Conform to the Surface of the Form.** C. O. Crane and P. J. Mulligan, both of Denver, Colo., assignors, by direct and mesne assignments, to United States Rubber Co., New York, N. Y.

2,310,515. **Nursing Bottle and Breast-Type Nipple Guard.** D. G. Chester, Daytona Beach, Fla.

2,310,565. **Auto Tire Force Pump.** O. J. Allison, assignor of one-half to O. A. Diaz, both of New Orleans, La.

2,310,788. **Apparatus for Inking a Rubber Printing Form.** W. Hummelshen, Siegburg, Germany; vested in the Alien Property Custodian.

United Kingdom

550,072. **Hose and Like Clips.** W. S. Bauer.

550,267. **Method of and Means for Jointing Cables and Wires.** Asea Electric, Ltd., and J.B. Olley.

TRADE MARKS

United States

399,503. **Zipper.** Conveyers. B. F. Goodrich Co., Akron, O.

399,572. Representation of a decorative circle containing the date: "**1870**" and a ribbon protruding from the side with the letters: "**BFG.**" Storage batteries. B. F. Goodrich Co., Akron, O.

399,584. **NorthTshore.** Golf balls. A. W. Morgan, Yonkers, N. Y.

399,586. **Cush-O-Liner.** Liners for pneumatic tires. Southern Mills, Inc., Atlanta, Ga.

399,587. **Wyndster Kloth.** Waterproof coats. United States Rubber Co., New York, N. Y.

399,588. **Keeshan Kloth.** Waterproof coats. United States Rubber Co., New York, N. Y.

399,596. **Vorite.** Processed vegetable oil. Pierce Oil Products Corp., East Rochester, N. Y.

399,599. **Piccocizer.** Plasticizers. Pennsylvania Industrial Chemical Corp., Clairton, Pa.

399,620. **Akronize.** Antioxidant. Aladdin Laboratories, Inc., Minneapolis, Minn.

399,671. **The Clara Barton Conductive Shoe.** Shoes. O'Donnell Shoe Co., St. Paul, Minn.

399,687. Representation of a silhouette of a girl walking over a city skyline above an oval containing the letters: "**TW**" and the words: "**Town Walkers.**" Shoes. Selby Shoe Co., Portsmouth, O.

399,695. Representation of an angular design with the word: "**Fortex.**" Elastic connectors. Arpy Laboratories, New York, N. Y.

399,700. **A-Y-G.** Leg device for holding down corsets. Freeman Mfg. Co., Sturgis, Mich.

399,725. Representation of a pen feed with the letter: "**C**" and the word: "**Flow.**" Fountain pens, mechanical pencils, erasers, etc. D. Kahn, Inc., North Bergen, N. J.

399,727. **Elfin.** Corsets, etc. Dominion Corset Co., Ltd., Quebec, P. Q., Canada.

399,728. Representation of a shoe with the word: "**Gloworms.**" Shoes. I. B. Kleinert Rubber Co., New York, N. Y.

399,755. **Lady Chesterfield.** Shoes. C. W. Marks Shoe Co., Chicago, Ill.

399,762. **California Classics.** Girdles. B. R. Hoelscher, doing business as California Classics, Los Angeles, Calif.

399,763. Representation of a label containing the letters: "**C C T T**" surrounding the letter: "**M**" and the word: "**Hangard**" below. Rubber gloves. May Department Stores Co. doing business as Famous-Barr Co., and M. O'Neil Co., New York, N. Y.

399,767. Women at Work. Women's apparel. J. C. Penney Co., Wilmington, Del.

399,783. **Ever Sweet.** Dress shields. E. M. Stolaroff, doing business as Natone Co., Los Angeles, Calif.

399,913. **Multipore.** Filters. United States Rubber Co., New York, N. Y.

399,985. **Overway.** Shoes. S. Cuetara, Boston, Mass.

Market Reviews

COMPOUNDING INGREDIENTS

ACTIVITY in the chemicals market remains unchanged from the quiet tone which has prevailed in past months. Buying was notable among rubber reclaimers who showed considerable interest in solvents and carbon blacks. The synthetic rubber program is not sufficiently under way to cause considerable changes in the market picture.

CARBON BLACKS. Statistics on carbon black for 1942 show a reduction in output and shipments which can be attributed to the loss of the automotive vehicle paint business and the slashing cut in the production of rubber goods. Rubber reclaimers are the principal buyers. Business is expected to increase more rapidly when the synthetic rubber program gains in momentum.

A new furnace-type carbon black entered the market last month and will be sold under the trade name "Sterling."

RUBBER SOLVENTS. Good buying tone was noted in the requests for benzol by government interests building up a stockpile for the synthetic rubber program. Alcohol requirements keep production moving steadily with no chance to create a reservoir for future needs. Rubber reclaimers head the buyer's list in this field also.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.035	$0.04
Rottenstone, domestic	*lb.*	.025	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	*ton*	25.00	
Litharge (commercial)	*lb.*	.09	
Magnesia, calcined, heavy	*lb.*		
technical, light	*lb.*	.0625	.07

Accelerators, Organic

A-1	*lb.*	.28	.33
A-10	*lb.*	.36	.42
A-19	*lb.*	.52	.65
A-32	*lb.*	.60	.70
A-46	*lb.*	.50	.57
A-77	*lb.*	.42	.55
A-100	*lb.*	.42	.55
Accelerator 49	*lb.*	.40	.42
808	*lb.*	.59	.61
833	*lb.*	1.13	1.15
Acrin	*lb.*	.65	
Advan	*lb.*	.52	.60
Aldehyde ammonia	*lb.*	.65	.70
Altax	*lb.*	.43	.45
Arazate	*lb.*	1.53	
B-J-F	*lb.*	.38	.43
Beutene	*lb.*	.59	.64
Butasan	*lb.*	1.13	
Butazate	*lb.*	1.13	
Butyl Eight	*lb.*	.97	.99
C-P-B	*lb.*	1.95	
Captax	*lb.*	.38	.40
D-B-A	*lb.*	1.95	
Delac A	*lb.*	.39	.48
O	*lb.*	.39	.48
P	*lb.*	.39	.48
Di-Esterex-N	*lb.*	.50	.57
DOTG (Di-orthotoly-guanidine)	*lb.*	.44	.46
DPG (Diphenylguanidine)	*lb.*	.35	.36
El-Sixty	*lb.*	.40	.47
Ethasan	*lb.*	1.13	
Ethazate	*lb.*	1.13	
Ethylideneaniline	*lb.*	.42	.43
Formaldehyde P.A.C.	*lb.*	.06	.0625
Formaldehyde-para-toluidine	*lb.*	$0.63	$0.65
Formaniline	*lb.*	.36	.37
Guantal	*lb.*	.39	.48
Hepteen	*lb.*	.34	.39
Base	*lb.*	1.25	1.40
Hexamethylenetetramine			
U.S.P.	*lb.*	.39	
Technical	*lb.*	.33	
Lead oleate, No. 999	*lb.*	.175	
Witco	*lb.*	.15	
Ledate	*lb.*	1.48	
M-B-T	*lb.*	.38	.40
M-B-T-S	*lb.*	.43	.45
Methasan	*lb.*	1.23	
Methazate	*lb.*	1.23	
Monex	*lb.*	1.53	
Morfex "33"	*lb.*	.67	.72
"55"	*lb.*	.96	1.01
O-X-A-F	*lb.*	.38	.43
Oxynone	*lb.*	.77	.90
Para-nitroso-dimethylaniline	*lb.*	.85	
Pentex	*lb.*	.74	.84
Flour	*lb.*	.1225	.1325
O	*lb.*		
Flour	*lb.*		
Phenex	*lb.*	.49	.54
Pipazate	*lb.*	1.53	
Pip-Pip	*lb.*	1.63	
R & H 50-D	*lb.*	.42	.43
Rotax	*lb.*	.48	.50
Safex	*lb.*	1.15	1.25
Santocure	*lb.*	.60	.67
Selenac	*lb.*	1.98	
SPDX	*lb.*	.69	.74
A	*lb.*	.69	.74
Super sulphur No. 2	*lb.*	.13	.15
Tetrone A	*lb.*	2.20	
Thiocarbanilide	*lb.*	.28	.33
Thiofide	*lb.*	.43	.50
Thionex	*lb.*	1.53	
Thiotax	*lb.*	.38	.45
Thiurad	*lb.*	1.53	
Thiuram E	*lb.*	1.53	
M	*lb.*	1.53	
Trimene	*lb.*	.54	.64
Base	*lb.*	1.03	1.18
Triphenylguanidine (TPG)	*lb.*	.45	
Tuads, Methyl	*lb.*	1.53	
Tuex	*ton*	1.53	
2-MT	*lb.*	.58	.60
Ulto	*lb.*	.99	1.04
Ureka	*lb.*	.50	.57
Blend B	*lb.*	.50	.57
C	*lb.*	.48	.55
Vulcanex	*lb.*	.42	.43
Z-B-X	*lb.*	2.45	
Zenite	*lb.*	.40	.42
A	*lb.*	.45	.47
B	*lb.*	.42	.44
Zimate, Butyl	*lb.*	1.13	
Ethyl	*lb.*	1.13	
Methyl	*lb.*	1.23	
Zipacel	*lb.*	1.65	

Activators

Aero Ac 50	*lb.*	.46	.52
Barak	*lb.*	.50	
MODX	*lb.*	.295	.345
SL-20	*lb.*	.1089	.1135

Age Resisters

AgeRite Alba	*lb.*	1.95	2.05
Gel	*lb.*	.52	.54
Hipar	*lb.*	.61	.63
Powder	*lb.*	.43	.45
Resin	*lb.*	.43	.45
D	*lb.*	.43	.45
White	*lb.*	1.23	1.33
Akroflex C	*lb.*	.53	.65
Albasan	*lb.*	.69	.74
Aminox	*lb.*	.43	.52
Antox	*lb.*	.54	.56
Betanox	*lb.*	.43	.52
B-L-E	*lb.*	.43	.52
Powder	*lb.*	.61	.70
B-X-A	*lb.*	.43	.52
Copper Inhibitor X-872-A	*lb.*	1.15	
Flectol H	*lb.*	.43	.55
White	*lb.*	.89	1.00
M-U-F	*lb.*	1.48	
Neozone (standard)	*lb.*	.61	.63
A	*lb.*	.43	.45
C	*lb.*	.43	.55
D	*lb.*	.43	.45
Distilled	*lb.*	.48	.50
E	*lb.*	.61	.63
Oxynone	*lb.*	.77	.90
Permalux	*lb.*	1.18	1.20
Santoflex B	*lb.*	.43	.55
BX	*lb.*	.54	.64
Santovar A	*lb.*	1.15	1.40
Stabilite	*lb.*	.48	.69
Alba	*lb.*	.50	.74
Thermoflex A	*lb.*	.61	.63
C	*lb.*	.54	.56
Tysonite	*lb.*	$0.16	$0.165
V-G-B	*lb.*	.43	.52

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70	3.55
Liquid, 50%	100 *lbs.*	1.95	
Solid (700-*lb. drums*)	100 *lbs.*	2.30	3.15

Antiscorch Materials

Antiscorch T	*lb.*	.90	
Cumar RH	*lb.*	.105	
E-S-E-N	*lb.*	.34	.39
R-17 Resin (*drums*)	*lb.*	.1075	
RM	*lb.*	1.25	
Retarder W	*lb.*	.36	
Retardex	*lb.*	.445	.475
U-T-B	*lb.*	.34	.39

Antiseptics

Compound G-4	*lb.*	1.50	
G-11	*lb.*	4.50	

Antisun Materials

Heliozone	*lb.*	.23	.24
S.C.R.	*lb.*	.32	.34
Sunproof	*lb.*	.2275	.2775
Jr.	*lb.*	.165	.215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	*lb.*	.0825	
Unicel	*lb.*	.50	

Brake Lining Saturant

B.R.T. No. 3	*lb.*	.0175	.0185

Colors

Black

Du Pont powder	*lb.*	.42	
Lampblack (commercial), *l.c.l.*	*lb.*	.15	

Blue

Du Pont Dispersed	*lb.*	.35	.95
Powders	*lb.*	2.25	3.75
Heliogen BKA	*lb.*		
Toners	*lb.*		

Brown

Mapico	*lb.*	.1135	

Green

Chrome	*lb.*	.25	
Oxide (*freight allowed*)	*lb.*	.24	
Du Pont Dispersed	*lb.*	.98	2.85
Powders	*lb.*	1.00	
Guignet's (*bbls.*)	*lb.*	.70	
Toners	*lb.*		

Orange

Du Pont Dispersed	*lb.*	.88	2.35
Powders	*lb.*	2.75	3.05
Toners	*lb.*		

Orchid

Toners	*lb.*		

Pink

Toners	*lb.*		

Purple

Toners	*lb.*		

Red

Antimony			
Crimson, 15/17%	*lb.*		
R. M. P. No. 3	*lb.*	.48	
Sulphur free	*lb.*		
R.M.P.	*lb.*	.52	
Golden 15/17%	*lb.*		
7-A	*lb.*	.37	
Z-2	*lb.*	.25	
Cadmium, light (400-*lb. bbls.*)	*lb.*	.85	.90
Du Pont Dispersed	*lb.*	.93	2.05
Powders	*lb.*	.60	1.65
Iron Oxide, *l.c.l.*	*lb.*	.0625	.15
Mapico	*lb.*	.096	
Rub-Er-Red (*bbls.*)	*lb.*	.0975	
Toners	*lb.*		

White

Lithopone (*bags*)	*lb.*	.0425	.045
Albalith	*lb.*	.0425	.045
Astrolith (50-*lb. bags*)	*lb.*	.0425	.045
Azolith	*lb.*	.0425	.045
Titanium Pigments			
Ray-bar	*lb.*	.055	.065
Ray-cal	*lb.*	.0525	.0625
Rayox	*lb.*	.135	.165
Titanolith (50-*lb. bags*)	*lb.*	.056	.0585
Titanox-A	*lb.*	.145	.175
B	*lb.*	.0575	.0625
30	*lb.*	.0575	.0625
C	*lb.*	.055	.06
RC	*lb.*	.055	.06
RC-HT	*lb.*	.055	.06
Ti-Tone	*lb.*		
Zopaque (50-*lb. bags*)	*lb.*	.145	.1525
Zinc Oxide			
Azo ZZZ-11	*lb.*	.0725	.075
44	*lb.*	.0725	.075
55	*lb.*	.0725	.075
66	*lb.*	.095	.0975
French Process, Florence			
Green Seal-8	*lb.*	.09	.0925
Red Seal-9	*lb.*	.085	.0875
White Seal-7	*lb.*	.095	.0975

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

Kadox, Black Label-15	lb.	$0.0725/$0.075
No. 25	lb.	.085 / .0875
72	lb.	.0725/ .075
Red Label-17	lb.	.0725/ .075
Horse Head Special 3	lb.	.0725/ .075
XX Red-4	lb.	.0725/ .075
23	lb.	.0725/ .075
72	lb.	.0725/ .075
78	lb.	.0725/ .075
80	lb.	.0725/ .075
103	lb.	.0725/ .075
110	lb.	.0725/ .075
St. Joe (lead free)		
Black Label	lb.	.0725/ .075
Green Label	lb.	.0725/ .075
Red Label	lb.	.0725/ .075
U.S.P.	lb.	.105 / .1075
Zinc Sulphide Pigments		
Cryptone-BA-19	lb.	.056 / .0585
BT	lb.	.056 / .0585
CB	lb.	.056 / .0585
MS	lb.	.0575/ .06
ZS No. 20	lb.	.0825/ .085
86	lb.	.0825/ .085
230	lb.	.0825/ .085
800	lb.	.0825/ .085
Sunolith	lb.	.0425/ .045

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	lb.	.60 / .65
Du Pont Dispersed	lb.	1.25 / 1.85
Powders	lb.	.70 / 1.75
Mapico	lb.	.071
Toners	lb.	

Dispersing Agents

Bardex	lb.	.0425/ .045
Bardol	lb.	.025 / .0275
B	lb.	.05 / .0525
Darvan No. 1	lb.	.30 / .34
2	lb.	.30 / .34
3	lb.	.30 / .34
Nevoll (*drums, c.l.*)	lb.	.02 / .025
Santomerse S	lb.	.11 / .25

Extenders

Advagum 1098	lb.	.42 / .45
1198	lb.	.33 / .40
Extendex C	lb.	
Naftolen	lb.	.15 / .20
"600" S	lb.	.14 / .16
Vanzak	gal.	.05 / .06

Fillers, Inert

Asbestine, *c.l.*	ton	20.00
Asbestos Fiber	ton	15.50 / 48.00
Barytes	ton	40.00
f.o.b., St. Louis (50-*lb. paper bags*)	ton	25.55
Off color, domestic	ton	29.00
White, domestic	ton	38.50
Blanc fixe, dry, precip	ton	80.00
Calcene	ton	37.50 /43.00
Infusorial earth	lb.	.0225
Kalite No. 1	ton	26.00
3	ton	36.00
Kalvan	ton	100.00
Magnesium Carbonate, *l.c.l.*	lb.	.0725/ .1075
Paradene No. 2 (*drums*)	lb.	.0525
Pyrax A	ton	7.50
Whiting		
Columbia Filler	ton	9.00 / 14.00
Suprex White	ton	32.50
Witco, *c.l.*	ton	8.00
Witcarb	lb.	

Finishes

Black-Out (surface protective)	gal.	4.50 / 5.00
Mica, *l.c.l.*	ton	20. /52.
Rubber lacquer, clear	gal.	1.00 / 2.00
Colored	gal.	2.00 / 3.50
Shoe varnish	gal.	1.45
Talc	ton	25.00

Flock

Cotton flock, dark	lb.	.09 / .10
Dyed	lb.	.40 / .80
White	lb.	.12 / .18
Rayon flock, colored	lb.	1.00 / 1.50
White	lb.	.75 / 1.00

Latex Compounding Ingredients

Accelerator 552	lb.	1.63
Aerosol OT Aqueous 25%	lb.	.30
Antox, dispersed	lb.	.54
Aquarex D	lb.	.75
F	lb.	.85
MDL Paste	lb.	.25
Areskap No. 50	lb.	.18 / .24
100, dry	lb.	.39 / .51
Aresket No. 240	lb.	.16 / .22
300, dry	lb.	.42 / .50
Aresklene No. 375	lb.	.35 / .50
400 dry	lb.	.51 / .65
Black No. 25, dispersed	lb.	.22 / .40
Casein, muriatic 30 mesh	lb.	.21
Collocarb	lb.	.07
Color Pastes, dispersed	lb.	.75 / 1.10
Copper Inhibitor X-872	lb.	2.25
Dispersex No. 15	lb.	.11 / .12
No. 20	lb.	.08 / .10
Factex Dispersion A	lb.	.17
Heliozone, dispersed	lb.	.25
MICRONEX, Colloidal	lb.	.06
R-2 Crystals	lb.	1.55
S-1 (400-*lb. drums*)	lb.	.65
Santobrite Briquettes	lb.	
Powder	lb.	
Santomerse D	lb.	$0.41 /$0.65
S	lb.	.11 / .25
Sodium Stearate	lb.	.40
Stablex A	lb.	.90 / 1.10
B	lb.	.70 / .95
C	lb.	.40 / .50
Sulphur, dispersed	lb.	.10 / .15
No. 2	lb.	.08 / .12
T-1 (440-*lb. drums*)	lb.	.40
Tepidone	lb.	.63
Tetrone A	lb.	2.20
Tysonite, dispersed	lb.	.32 / .35
Zenite Special	lb.	.47
Zinc oxide, dispersed	lb.	.12 / .15

Mineral Rubber

Black Diamond, *l.c.l.*	ton	25.00 /30.00
B.R.C. No. 20	lb.	.0105/ .0115
Hydrocarbon, Hard	lb.	25.00 /27.00
MilliMar	lb.	.055
Parmr	ton	
Pioneer, *c.l.*	lb.	25.00 /30.00
285°-300°	ton	25.00 /27.00

Mold Lubricants

Aluminum Stearate	lb.	.23 / .24
Aquarex D	lb.	.75
MDL Paste	lb.	.25
Colite	gal.	.90 / 1.15
Lubrex	lb.	.25 / .30
Mold Paste	lb.	.12 / .30
Rubber-Glo, conc. regular	gal.	.94 / 1.15
Type W	gal.	.99 / 1.20
Sericite	ton	65.00
Soapstone, *l.c.l.*	ton	25.00
Zinc Stearate	lb.	.30 / .31

Oil Resistant

A-X-F	lb.	.82 / .85

Reclaiming Oils

B.R.V.	lb.	.035 / .0375
C-10	gal.	.19 / .24
D-4	gal.	.17 / .22
E-5	gal.	.15 / .20
No. 1621	lb.	.021 / .0235
S.R.O.	lb.	.02 / .0225
X-60 (reclaiming)	gal.	.20 / .27
X-443	gal.	.29

Reenforcers

Alumina, Hydrated		
Alorco C-740	lb.	.0375/ .065
C-741	lb.	.0375/ .065
Carbon Black		
Aerfloted Arrow Specification (*bags only*)	lb.	.0355†
Arrow Compact Granulized	lb.	.0355†
Certified Heavy Compressed (*bags only*)	lb.	.0355†
SPHERON	lb.	.0355†
Channel "S"	lb.	.12
Continental, dustless	lb.	.0355†
"AA"	lb.	
Compressed (*bags only*)	lb.	.0355†
Disperso	lb.	.0355†
Dixie	lb.	.0355†
Dixiedensed	lb.	.0355†
66	lb.	.0355†
Furnex	lb.	.035
Beads	lb.	.035
Gastex	lb.	.035 / .06
HX	lb.	.0355†
Kosmobile	lb.	.0355†
66	lb.	.0355†
77	lb.	.0355†
S	lb.	.0355†
Kosmos	lb.	.0355†
Dixie 20	lb.	.035†
MICRONEX Beads	lb.	.0355†
Hi-Tear	lb.	.0355
Mark II	lb.	.0355
Standard	lb.	.0355
W-5	lb.	.0355
W-6	lb.	.0355
P-33	lb.	.0475
Pelletex	lb.	.035 / .06
SPHERON C (*bags*)	lb.	.0455†
I (*bags*)	lb.	.0405
N (*bags*)	lb.	.15
T (*bags*)	lb.	.09
Statex	lb.	
STERLING	lb.	.035
Thermax	lb.	.0225
"S"	lb.	.0675
TX	lb.	.0355†
Velvetex	lb.	
"WYEX BLACK"	lb.	.0355†
Carbonex Flakes	lb.	.03 / .035
S	lb.	.031 / .036
Plastic	lb.	.031 / .0335
Clays		
Aerfloted Hi-White	ton	10.00
LGB	ton	15.00
Paragon (50-*lb. bags*)	ton	10.00
Suprex (50-*lb. bags*)	ton	10.00 /23.50
Catalpo, *c.l.*	ton	30.00
China	ton	25.00
Dixie	ton	10.00 /22.50
"L"	ton	10.00
Langford	ton	8.50
McNamee	ton	10.00
Par	ton	10.00

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Paraforce, *c.l.*	ton	$50.00
Witco, *c.l.*	ton	10.00
Cumar EX	lb.	.05
MH	lb.	.065 /$0.115
V	lb.	.095 / .125
465 Resin	lb.	
"G" Resin	lb.	
Nevindene	lb.	
Silene	lb.	.04 / .045

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Para-Dors	lb.	.65 / 5.00
Rodo No. 0	lb.	4.00 / 4.50
10	lb.	5.00 / 5.50

Rubber Substitutes

Black	lb.	.085 / .13
Brown	lb.	.085 / .1375
White	lb.	.09 / .15
Factice		
Amberex Type B	lb.	.1875
Brown	lb.	.085 / .1375
Fac-Cel B	lb.	.15
C	lb.	.15
Neophax A	lb.	.165
B	lb.	.165
White	lb.	.09 / .15

Softeners and Plasticizers

Ambidex Regular	lb.	
S	lb.	
B.R.T. No. 7	lb.	.02 / .021
Bondogen	lb.	.98 / 1.05
Bunnatol (for synthetic rubber)	lb.	
G	lb.	.40 / .50
S	lb.	.40 / .50
Burgundy pitch	lb.	
Copene Resin	lb.	.32
Cycline oil	gal.	.14 / .20
Dipolymer Oil	gal.	.33 / .38
Dispersing Oil No. 10	lb.	.0375/ .04
LM-Nypene (*drums*)	lb.	.25
LX-436 (*tank car*)	lb.	.027
Myristilene	lb.	.20 / .30
Nevinol	lb.	.13 / .14
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	lb.	.029
3-X	lb.	.29 / .0425
Nypene Resin	lb.	.32
Palm oil (Witco), *c.l.*	lb.	
Palmalene	lb.	.15 / .25
Palmol	lb.	.16
Para Flux (reg.)	gal.	.17 / .18
No. 2016	gal.	.135 / .19
Para Lube	lb.	.046 / .048
Paradene No. 1 (*drums*)	lb.	.0525
Special (*drums*)		
20 to 35° C. M.P.	lb.	.0625
35 to 45° C. M.P.	lb.	.0625
45 to 75° C. M.P.	lb.	.0575
Peptizene	lb.	.65
Piccocizer "30"	lb.	
Piccolyte Resins	lb.	.147 / .185
Piccoumaron Resins	lb.	.045 / .15
Pictar	gal.	.18 / .23
Pine tar	gal.	
Oil	gal.	.42
Plasticizer B	lb.	.35 / .45
Plastoflex No. 10	lb.	.20 / .25
No. 20	lb.	.25 / .30
Plastogen	lb.	.0775/ .08
Plastone	lb.	.27 / .30
R-19 Resin (*drums*)	lb.	.1075
21 Resin (*drums*)	lb.	.1075
Reogen	lb.	.115 / .12
RPA No. 1E	lb.	.55
2	lb.	.65
3	lb.	.46
4	lb.	.80
Tackol	lb.	.085 / .18
Tarzac	lb.	.23 / .24
Tonox	lb.	.50 / .59
Vistac No. 1	lb.	.20 / .214
No. 2	lb.	.214 / .227
Witco No. 20, *l.c.l.*	gal.	.20
X-1 resinous oil (*tank car*)	lb.	.011 / .016
XX-100 Resin	lb.	.0525

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	lb.	.015 / .016
60°C. M.P.	lb.	.015 / .016
75°C. M.P.	lb.	.015 / .016

Solvents

Beta-Trichlorethane	lb.	.20
Carbon Bisulphide	100 lbs.	5.75
Tetrachloride	gal.	.80
Cosol No. 1	gal.	.26
No. 2	gal.	.25
No. 3	gal.	.22
Industrial 90% benzol (*tank car*)	gal.	.15 / .22
Nevsol	gal.	.245 / .31
Picco	gal.	.22 / .32
Skellysolve	gal.	

Stabilizers for Cure

Barium Stearate	lb.	.29 / .32
Calcium Stearate	lb.	.26 / .27
Laurex (*bags*)	lb.	.1475/ .1725
Lead Stearate	lb.	
Magnesium Stearate	lb.	.31 / .32
Stearex B	lb.	.14 / .15
Beads	lb.	.1375/ .1425

Stearic acid, single pressed	*lb.*	$0.14	/ $0.15
Stearite, *c.l.*	*lb.*	.1375	
Zinc Laurate	*lb.*	.29	/ .32
Stearate	*lb.*		/ .31

Synthetic Rubber

Agripol Solids *l.c.*	*lb.*	.44	/ .51
Solutions *l.c.*	*lb.*	.23	/ .275
Falkomer 106	*lb.*	.30	
108	*lb.*	.30	
Hycar OR-15	*lb.*	.70	
OS-10	*lb.*	.70	
Neoprene Latex Type 571	*lb.*	.30	
60	*lb.*	.36	
Neoprene Type CG	*lb.*	.70	
E	*lb.*	.65	
FR	*lb.*	.75	
G	*lb.*	.70	
GN	*lb.*	.65	
ILS	*lb.*	.70	
KNR	*lb.*	.75	
M	*lb.*	.65	
Perbunan 26	*lb.*	.65	
Synthetic 100	*lb.*	.41	
"Thiokol" Type "A"	*lb.*	.35	
"FA"	*lb.*	.50	
"RD"	*lb.*	.70	
Molding powder No. 455	*lb.*	.71	
472	*lb.*	.61	

Tackifiers

B.R.H. No. 2	*lb.*	.02	/ .021
LX-433 (*tank car*)	*lb.*	.068	
P.H.O. (*drums*)	*lb.*	.24	
Plastac	*lb.*	.10	.15

Vulcanizing Ingredients

Magnesia, light (for neoprene)	*lb.*	.26	
Sulphur	*100 lbs.*	2.05	
Chloride (*drums*)	*lb.*	.04	
Telloy	*lb.*	1.75	
Thiogen 6	*lb.*	.18	/ .25
10	*lb.*	.18	/ .25
Vandex	*lb.*	1.75	
(See also Colors—Antimony)			

Waxes

736 (clear)	*gal.*	1.25	
1515-A (black)	*gal.*	1.35	
Carnauba, No. 3 chalky	*lb.*		
2 N.C.	*lb.*		
3 N.C.	*lb.*		
1 Yellow	*lb.*	.8325	
2	*lb.*	.8125	
Carnube	*lb.*	.49	/ .59
Monten	*lb.*	.12	/ .17
Rubber Wax No. 118, Neutral	*gal.*	.76	/ 1.31
Colors	*gal.*	.86	/ 1.41

Fixed Government Prices

Balata†	Price per Lb.
Manaos Black	$0.38\frac{3}{4}$
Surinam Sheet	.42$\frac{1}{2}$
Guayule	.17$\frac{1}{2}$
Plantation Grades*	
No. 1-X R.S.S. in Cases	.22$\frac{1}{2}$
No. 1 Thin Latex Crepe	.23$\frac{5}{16}$
No. 2 Thick Latex Crepe	.23$\frac{5}{16}$
No. 1 Brown Crepe	.21$\frac{3}{8}$
No. 2 Brown Crepe	.21$\frac{1}{16}$
No. 2 Amber	.21$\frac{3}{8}$
No. 3 Amber	.21$\frac{1}{16}$
Rolled Brown	.17$\frac{13}{16}$
Synthetic Rubber	
GR-S (Buna S)	.50
GR-M (Neoprene GN)	.65

*For a complete list of government prices see our June, 1942, issue, p. 254.
†For complete list see p. 581.

Rims Approved and Branded by The Tire & Rim Association

Rim Size	Jan., 1943
15" & 16" D. C. Passenger	
16x4.25E	3,551
16x4.50E	1,817
16x5.00F	2,537
15x5.50F	2,646
17" and over D. C. Passenger	
18x2.15B	16,512
Military	
16x4.50CE	100,472
16x6.50CS	25,432
18x8.00CV	2,930
20x4.50CR	9,074
20x6.00CT	22,816
20x10.00CW	1,991
24x10.00CW	1,693
Flat Base Truck	
17x4.33R (6")	1,109
20x4.33R (6")	1,660
24x4.33R (6")	405
15x5.00S (7")	3,994
18x5.00S (7")	1,555
20x5.00S (7")	282,582
24x5.00S (7")	632
15x6.00T (8")	2,847
20x6.00T (8")	32,712
22x6.00T (8")	4,637
18x7.33V (9 10")	299
20x7.33V (9 10")	24,393
24x7.33V (9 10")	627
20x8.37V (11")	2,445
24x8.37V (11")	1,259
24x10.00W	1,225
Semi D. C. Truck	
16x4.50E	2,584
16x5.50F	5,370
Tractor & Implement	
12x2.50C	406
20x3.25E	49
20x8.00T	346
24x8.00T	3,154
W8-24	1,203
Cast	
24x10.00	5
24x15.00	61
TOTAL	567,030

Sales of Lead and Zinc Pigments and Zinc Salts

THE Bureau of Mines, United States Department of the Interior, Washington, D. C., on February 15, announced a sharp drop in the sales of lead and zinc pigments and zinc salts in 1942. A tighter situation in regard to supplies caused zinc pigments to be more seriously affected than the lead group. The competitive titanium pigments fared about the same as the lead class in 1942. Sales of zinc pigments, as a whole, in 1942 were about 26% lower than in 1941. Statistics on lead and zinc pigments sold by domestic manufacturers in 1941 and 1942 are shown below.

LEAD AND ZINC PIGMENTS AND ZINC SALTS SOLD BY DOMESTIC MANUFACTURERS IN THE UNITED STATES, 1941-42, IN SHORT TONS

	1941	1942
Basic lead sulphate or sublimed lead:		
White	*8,739	*6,900
Blue	*1,631	*1,200
Red lead	53,838	47,300
Orange mineral	246	100
Litharge	‡122,280	‡91,600
White lead:		
Dry	54,689	35,300
In oil†	58,311	48,900
Zinc oxide	148,833	100,100
Leaded zinc oxide	68,920	48,700
Lithopone	176,642	142,200
Zinc sulphate	19,201	14,300

* Exclusive of basic lead sulphate used for the manufacture of leaded zinc oxide which is included in tonnages shown for that pigment.
† Weight of white lead only.
‡ Includes some basic lead acetate used for the same purpose as litharge.

RUBBER SCRAP

IN VIEW of the almost complete control of the buying and selling of rubber scrap by government agencies and the absence of any real market, no further attempt will be made to write comments for the duration. Listing of fixed prices on selected grades will continue to appear each month however.

Maximum Prices at Consuming Centers

Inner Tubes†	¢ per Lb.
No. 2 passenger tubes	7$\frac{3}{4}$
Red passenger tubes	7$\frac{1}{2}$
Passenger tubes	6

Tires‡	$ per Short Ton
Mixed passenger tires	30.00
Beadless passenger tires	38.00
Solid tires	34.00
Peelings†	
No. 1 peelings	75.00
No. 2 peelings	47.50
No. 1 light colored (zinc) carcass	82.50
Miscellaneous Items‡‡	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 1.15 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
‡‡ All consuming centers.

COTTON & FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Dec. 26	Jan. 30	Feb. 6	Feb. 13	Feb. 20
Mar.	19.08	19.70	19.69	19.78	20.18
July	18.94	19.36	19.34	19.31	19.67
Oct.	18.88	19.06	19.14	19.17	19.45
Dec.	18.88	19.01	19.10	19.15	19.44

New York Quotations

February 24, 1943.

Drills

38-inch 2.00-yard	yd.	....
40-inch 1.45-yard		....
50-inch 1.52-yard		$0.29
52-inch 1.85-yard		.23⅞
52-inch 1.90-yard		.23223/.23¼
52-inch 2.20-yard		.20511
52-inch 2.50-yard		.185
59-inch 1.85-yard		.23851

Ducks

38-inch 2.00-yard D. F.	yd.	.21½/.22⅝
40-inch 1.45-yard S. F.		.29¾
51½-inch 1.35-yard D. F.		.33½
72-inch 1.05-yard D. F.		.43/.45
72-inch 17-21 ounce		.48⅞
Mechanicals		
Hose and belting	lb.	.42¾
Tennis		
51½-inch 1.35-yard	yd.	.31½
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅛

Hollands—White

Blue Seal		
20-inch	yd.	.13½
30-inch		.24¼
40-inch		.27
Gold Seal		
20-inch No. 72	yd.	.14½
30-inch No. 72		.25¾
40-inch No. 72		.29
Red Seal		
20-inch	yd.	.12¼
30-inch		.22
40-inch		.24½

Osnaburgs

40-inch 2.34-yard	yd.	.15½
40-inch 2.48-yard		.14⅝
40-inch 2.56-yard S. F.		.14578
40-inch 3.00-yard		.12¾
40-inch 7-ounce part waste		.15
40-inch 10-ounce part waste		.21⅜
37-inch 2.42-yard clean		.15¼

Raincoat Fabrics

Cotton		
Bombazine 64 x 60	yd.	....
Plaids 60 x 48		....
Surface prints 64 x 60		....
Print cloth, 38½-inch, 64 x 60		.08971
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard		.13968
56 x 60, 3.60-yard		.11944
44 x 40, 4.25-yard		.09764
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.08600
44 x 40, 6.15-yard		.06991

Tire Fabrics

Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.54½
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.53½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.53½
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.54½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.52½
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.53½
23/5/3 Karded peeler, 1¼" cotton	lb.	.54½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.54½

PASSAGE of the Pace Bill continues to exert a strong influence on the market, which continued its spell of nervous buying for another month. The Casablanca conference was favorably interpreted to mean that the heavy cotton orders now placed would not decline in volume as yet. The Administration's request for $100,000,000 to implement the incentive payment program to bring out increased production of foodstuffs was voted down, 6 to 1, by the House Appropriations subcommittee. The farm bloc would like to do away with incentive payments and subsidies and substitute a straight upward revision of prices based on parity prices that would include the cost of farm labor, including that of the farmer himself and his family. While the government may make some compromise and support farm prices at full parity value of food and feed crops, it is expected that cotton would be included in these concessions and receive as much of the benefits as other farm products. Cotton growers, feeling the considerable shortage of labor, are expected to plant less acreage in the coming year, although Secretary of Agriculture Wickard has appealed to farmers to plant all of their allotments as not only cotton is needed, but its by-products of cottonseed for crop feed and cottonseed oil are essential to the war program. The National Cotton Conference-Forum under the sponsorship of the New York Cotton Exchange would like to see the cotton acreage goals liberalized. The cotton referendum, voted upon December 12, 1942, to determine whether farmers favor or oppose marketing quotas, resulted in an 86.2% affirmative vote, making effective the National Marketing Quota for the year beginning August 1, 1943.

Consumption of cotton bales during January totaled 915,479 bales, against 947,539 bales for January, 1942, and 935,511 bales for December, 1942. In the interest of national defense, the Department of Commerce has discontinued until further notice the publication of detailed statistics concerning imports and exports.

The price of 15/16-inch spot middling grade dropped from 21.49¢ a pound on February 2 to 21.39¢ on February 6, and spiraled upward to 22.01¢, February 23, closing at 21.98¢ on March 3.

The futures price reached a peak bid of 20.46¢ on February 23, highest level in fourteen years, as no tenders were made on the first day for delivery of March contracts.

Fabrics

At the recent annual meeting of the National Cotton Council the cotton industry announced its intention to fight for its tire cord market which is being seriously threatened by the rayon industry now looking forward to governmental approval of an expansion of its facilities in the cord market. Cotton men contend the changeover will divert much needed strategic materials from the war program. Besides machinery, steel, and other war materials, the program would absorb large quantities of cotton linters, vitally needed in munitions output. The battle has begun and is not merely being fought for wartime business, but principally for post-war markets when the return to civilian production will help take up the gaps in the cotton market left by cancellations of government orders in other fabrics.

Hose duck, raincoat sheetings, and balloon cloths were among military requests for bids during the past month. There is a report that looms now on bandoleers would be converted to production of raincoat sheetings.

A maximum price for ducks was included in Amendment 16 to MPR 118—Cotton Products, issued on February 22, 1943, the section relating to ducks is retroactive as of November 1, 1942.

Prices remain subject to the ceilings established last year, with the exception of tire fabrics which continue to rise another ½¢.

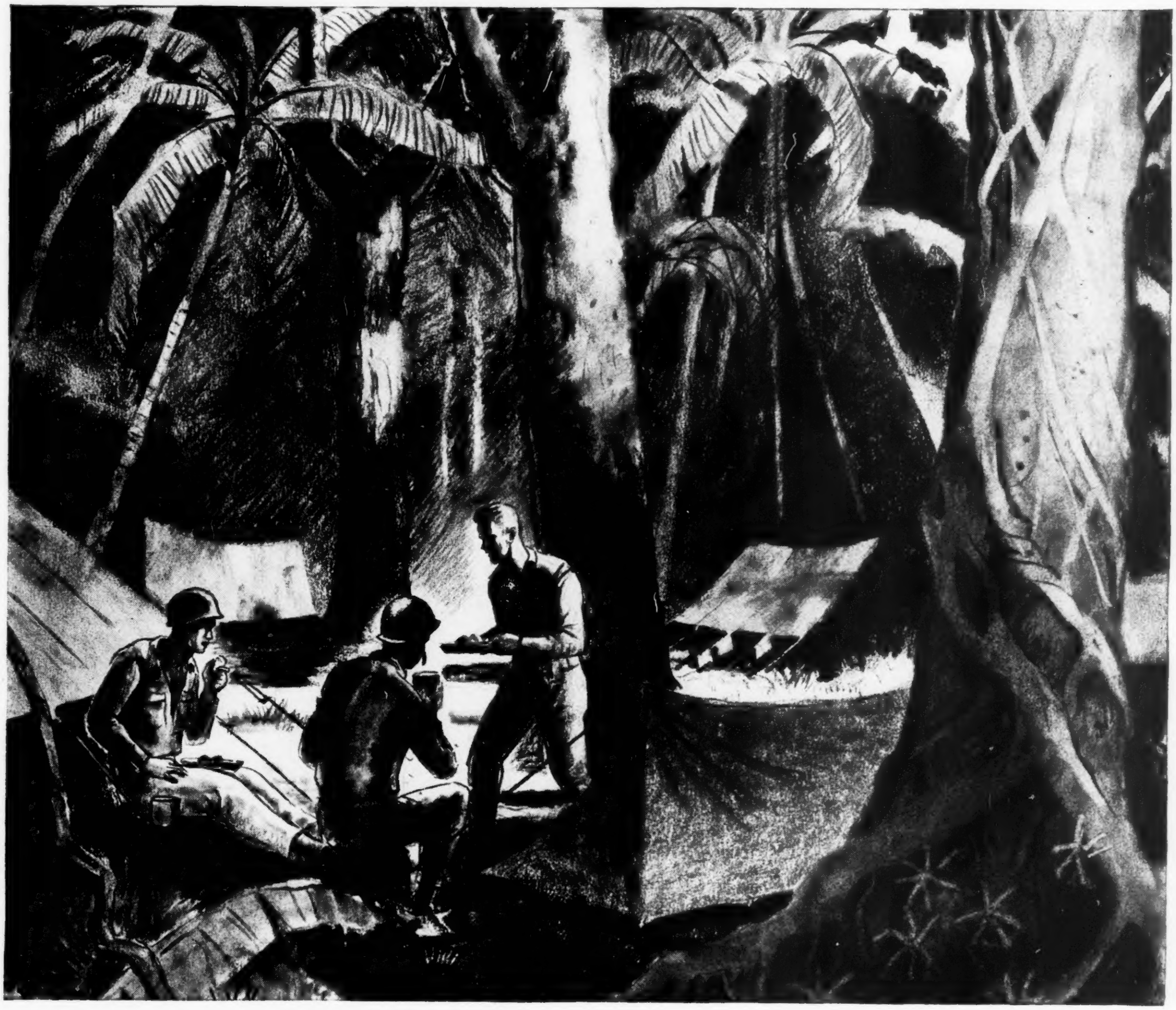
RECLAIMED RUBBER

PRODUCTION of reclaimed rubber continues at a high level, with every effort being made to reach maximum production. The demand for reclaimed rubber will be even greater than before in view of new lower estimates of synthetic rubber production for 1943 contained in Progress Report No. 2 of the Rubber Director. Increasing interest in availability, properties, and prices of reclaimed synthetic rubber is evident. Ceiling prices on selected grades of reclaimed natural rubber are listed below:

Ceiling Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.32	12 /12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5½
White	1.35-1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a ariety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.



CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.		*Replies forwarded without charge*

SITUATIONS OPEN

Established New England Rubber Manufacturer employing approximately 1,000 people interested in Plant Manager. Presently engaged 100% in War Work with very bright post-war outlook. Please give full details as to education, experience, and salary you would consider. Our personnel is aware of this ad.

Address Replies to Box No. 543, care of INDIA RUBBER WORLD

Persons presently engaged in War Work, using his highest skill, will not be considered.

CHEMIST'S ASSISTANT FOR RESEARCH AND development work. One with experience in the field of adhesives and the coating of fabrics with synthetic resins and synthetic rubber preferred. Reply giving salary expected and state experience. Wonderful opportunity for advancement. Address Box No. 541, care of INDIA RUBBER WORLD.

TECHNICAL DEPARTMENT OF OLD-ESTABLISHED FIRM actively in War Production has really worth-while opening as head of Physical and Chemical Testing Division. Wide experience in the testing of rubber and related products and familiarity with specifications essential. Address Box No. 542, care of INDIA RUBBER WORLD.

WANTED: GENERAL SUPERINTENDENT BY ONE OF THE OLDest and most reliable concerns in the manufacture of Industrial Rubber Goods—making Hose, Beltings, Packings, Molded Goods, etc.—over 9,000 items in the entire line. Must know both construction and labor costs, supervise 1,000 men and women, and be able to handle all labor difficulties. Must know various Hose constructions of all types, sizes, and kinds—same thing applying to Packings, Beltings, etc. Should have considerable Compounding experience. The man desired must be not subject to the draft and must have had complete experience. Exceptional opportunity for the right party. Address Box No. 546, care of INDIA RUBBER WORLD.

CHEMIST: FOR DEVELOPMENT WORK COMPOUNDING IN MEchanical Rubber Goods, both molded and extruded. Experience in rubber and synthetics desirable. Should have deferred classification. Position permanent. Factory located in Massachusetts. Address Box No. 549, care of INDIA RUBBER WORLD.

RESEARCH CHEMIST: FOR RESEARCH ON LATEX AND SYNthetic rubber. Graduate study and some industrial experience desirable. Knowledge of colloid chemistry helpful. Plant in New England engaged in war work. Permanent position. Address Box No. 550, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

WANTED: MANAGER OF WAREHOUSES AND SUPERINTENdent of operations for a national organization. Experienced, energetic man with ability to organize and handle operations and personnel. Some knowledge of engineering required. Rubber experience preferred. Applications will be treated in strict confidence. Address Box No. 551, care of INDIA RUBBER WORLD.

MAINTENANCE ENGINEER WITH EXPERIENCE IN RUBBER plant. Excellent opportunity for right man both now and after the war with established company in New England. Address Box No. 555, care of INDIA RUBBER WORLD.

CHEMIST WANTED BY AN OLD-ESTABLISHED mechanical rubber manufacturing plant located in Connecticut within approximately 60 miles of New York City. Applicant should be experienced in rubber and synthetic rubber compounding. Please write giving full particulars to Box No. 556, care of INDIA RUBBER WORLD.

WANTED: MAN TO TAKE FULL CHARGE OF PLANT MAKING camelback, also reclaim superintendent and master mechanic. Address Box No. 559, care of INDIA RUBBER WORLD.

CHEMIST FOR RESEARCH AND DEVELOPMENT WORK, PREFerably with experience in rubber laboratory, wanted by medium-size Midwest company engaged in defense work. Address Box No. 560, care of INDIA RUBBER WORLD.

WANTED: GRADUATE CHEMIST. EXPERIENCED IN SYNTHEtic adhesives to replace rubber. Draft deferred. State full experience when replying. Address Box No. 563, care of INDIA RUBBER WORLD.

MEXICO CITY FIRM WISHES TO EMPLOY AN experienced engineer with good salary for the manufacture of rubber articles, including those for the Railroad in accordance with American Railroad specifications. Give full experience, qualifications, etc., in first letter. Address: MANUFACTURAS DE HULE, EL MUNDO, S. A., Av. 5 de Mayo #29—Desp. 401, Mexico, D. F., Mexico.

SITUATIONS WANTED

FACTORY MANAGER: B.S. CHEMICAL ENGINEERING. DRAFT 3A. Fifteen years' experience in Rubber specification compounding, Cost estimating, Sales engineering, Production planning and supervision. Up-to-minute manufacturing experience with natural or synthetic rubbers, synthetic resins and elastomers for molded miscellaneous, mechanicals, drug sundries, sponge, tubing machine products, cements and coatings. Employed, but desires change. Would like to consider a similar position or technical sales or technical consulting. Address Box No. 544, care of INDIA RUBBER WORLD.

LATEX CHEMIST—30 YEARS OLD, DRAFT DEFERRED, 4 YEARS' experience in control and development work with rubber latex, synthetic latex, and artificial rubber dispersions. Desires position of same nature. Address Box No. 547, care of INDIA RUBBER WORLD.

COMPOUNDER. FIVE YEARS' EXPERIENCE WITH RUBBER and synthetic mechanicals and miscellaneous compounding. Also latex. Desires position with small progressive company. Married, with two children. Salary $3600. Address Box No. 561, care of INDIA RUBBER WORLD.

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MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—Triplex Hydraulic Pump 2.85 g.p.m. at 3550# pressure; 1—Hydro-Accumulator 2500 PSI, 16⅓ gals., complete with tank, compressor and piping; 1—W. S. 15"x18" Hydraulic Press, 10" dia. ram; 2—D. & B. 20½x20½ platens; 1—14"x24" Press, 9" ram; 9—24"x55" Steel Cored Heating Platens; 1—Stokes "N" Pilling Machine; 1—Farrel-Birmingham 15"x36" Rubber Mill; 4—W. & P. Mixers; 1—Set of Compound Rolls 15"x36"; Adamson 6" Tuber; Dry Mixers; Pulverizers; Grinders; Tubers; Hydraulic Pumps; Calenders, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 3—HYDRAULIC PRESSES; 7—CHANGE CAN MIXERS, 8 to 40 gals.; No. 20 Banbury Mixer; W. & P. Mixers, Lab. to 200 gal.; 6—Preforming Machines; 3—Vacuum Shelf Dryers. We buy your surplus equipment for cash. BRILL EQUIPMENT COMPANY, 183 Varick Street, New York City.

2—54 x 18 CALENDER ROLLS. GOOD CONDITION. KEATON RUBBER CO., 429 Adams St., Newark, N. J.

FOR SALE: 3 HAND WHEEL SCREW VULCANIZING PRESSES, Platens 24" x 18" and 6—20" x 20" complete with pressure gages, steam traps, pipe and fittings to assemble in space 30 ft. x 4 ft. in one row, including galvanized-iron-covered work bench 24" wide. STANDARD RUBBER CO., 435 Brannan St., San Francisco, Cal.

FOR SALE: 370 USED METAL CALENDER SHELLS IN EXCELlent condition. Difficult to obtain because of steel shortage. All heavy-duty with 1—⅜" square hole. 200—10" dia. x 52" long; 40—5" dia. x 42" long; 30—5" dia. x 44" long; 100—5" dia. x 48" long. Address Box No. 545, care of INDIA RUBBER WORLD.

THREE-ROLL FRICTION AND COATING CALENDER; 1—22 x 64 Birmingham Calender with #3 Birmingham drive. Condition excellent. ADDRESS P. O. BOX 852, LA CROSSE, WISCONSIN.

(Classified Advertisements Continued on Page 632)

Classified Advertisements

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MACHINERY AND SUPPLIES WANTED

2 — STEAM - HEATED HYDRAULIC MOLDING presses, 24" x 24", two-opening, 12" or 14" ram; will consider other sizes. Address Box No. 548, care of INDIA RUBBER WORLD.

WANTED: VACUUM SHELF DRYERS AND ROTARY VACUUM dryers. Address Box No. 553, care of INDIA RUBBER WORLD.

WANTED: BANBURY MIXER, MILLS, CALENDER, HYDRAULIC Presses, with pump and accumulator. Tubers. Any Condition. Address Box No. 557, care of INDIA RUBBER WORLD.

WANTED: COUPLE OF DOZEN WATER BOTTLE MOLDS, smooth or corrugated. Address Box No. 558, care of INDIA RUBBER WORLD.

WANTED: PAPER DRYER OR COMPLETE COATING machine, also other equipment. Used paper dryer or complete pyroxylin or similar paper coating machine up to 54" wide. Also 50-gal. and 300 to 500-gal. mixers, filter presses. Not a dealer. Write full details. Address P. O. Box 270, Morristown, N. J.

BUSINESS OPPORTUNITIES

AVAILABLE FOR LEASE, SMALL RUBBER PLANT IN LARGE midwestern city. Address Box No. 552, care of INDIA RUBBER WORLD.

WE ARE INTERESTED TO PURCHASE MEDIUM-SIZE RUBBER factory located in East. Must have presses and other machinery suitable for making sheet rubber sundry items. Write full particulars. Address Box No. 554, care of INDIA RUBBER WORLD.

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